THE CORTICIACEAE AND THE RESUPINATE HYDNACEAE OF TAIWAN[1]

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(Manuscript received 20 October, 1987; revised version accepted 16 December, 1989)

Abstract: As the result of floristic survey of Formosan Corticiaceae and the resupinate Hydnaceae, ten genera and 26 species are recognized in this first report. Among them, eight taxa are treated as new species, i.e., *Hyphodontia crassa*, *Hyphodontia dimorpha*, *Hyphodontia lageniformis*, *Peniophora spathulata*, *Phanerochaete alba*, *Phanerochaete commixtoides*, *Phanerochaete globossum*, and *Phlebia dictyophoroides*. One combination, *Hyphodontia mucronata* (Furukawa), and one new variety, *Gloeocystidiellum luridum* (Bres.) Boid. var. *microsporum* are proposed. The rest are new record to Taiwan.

INTRODUCTION

Formosan Corticiaceae and resupinate Hydnaceae have been reported sporadically by Sawada (1919, 1933, 1942, 1959), Tu (1968, 1975), Tu and Kimbrough (1969), and Chen *et al.* (1975) and the following taxa were recorded since then. 1). *Corticium salmonicolor* Berk. et Broom (=*Phanerochaete salmonicolor* (Berk. et Br.) Jülich), 2). *Phlebia strigosozonata* (Schw.) Lloyd (=*Punctularia strigosozonata* (Schw.) Talbot), 3). *Athelia rolfsii* (Curzi) Tu et Kimbrough, 4). *Thanatephorus sasakii* (Shirai) Tu et Kimbrough, 5). *Thanatephorus cucumeris* (Frank) Donk, 6). *Peniopora affinis* Burt, 7). *Hypochnus cinnamomi* Sawada, 8). *H. erythroxyli* Sawada, 9). *H. setariae* Sawada. During 1974-1976, Lin (1976) conducted an extensive survey on this group of fungi in Taiwan and revealed twelve genera and 32 species. Based on this contribution, Chen and Lin (1977) listed 52 species of non-poroid resupinate Aphyllophorales of Taiwan. Lin's specimens have been rechecked recently and some taxa are revised. All specimens described here are deposited at the Mycological Herbarium (TAI), Department of Botany, National Taiwan University, Taiwan, ROC.

DESCRIPTION OF SPECIES

1. *Grammothele lineata* Brek. et Curt. Fig. 1

Journ. Linn. Soc. Bot. 10: 327, 1869; —*Grammothele polygramma* Berk. et Curt., Journ. Linn. Soc. Bot. 10: 327, 1868; —*Grammothele grisea* Berk. et Curt., Journ. Linn. Soc. Bot. 10: 327, 1868; —*Polyporus hydnoporus* Berk., Bidenskab. Medd. For. Kjebenh. for. 1879-80, p. 751; —*Porogramme duporti* Pat., Soc. Mycol. France Bul. 29:

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208, 1913; —*Grammothele cineracea* Bres., Hedwigia **56**: 299, 1915.

Macroscopic characters: Basidiocarps resupinate, widely effused, strongly adnate, longitudinally spreading, 170-250 μm thick, 2.7-4×10-15 cm, ceraceous, even, felty in appearance, with reticulate ridges, finely linearly cracked, salmon-buff or seashell pink when fresh, light buff or cartridge buff when dry, not changing color or turning darker in 5% KOH; margins thining out, farinose, white, concolorous.

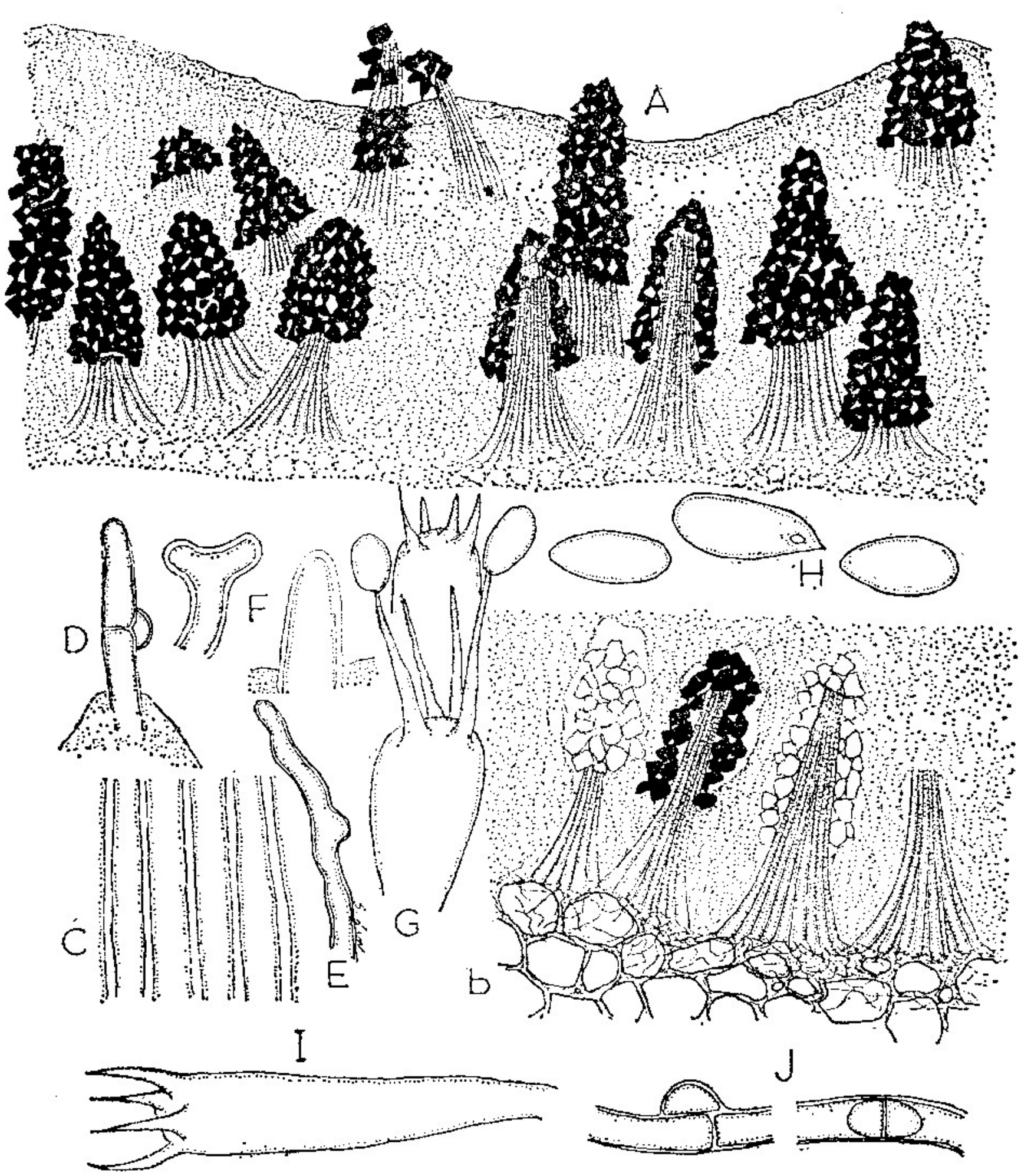

Fig. 1. *Grammothele lineata* Berk. et Curt.

(A): Longitudinal section of basidiocarp showing the encrusted fascicles immersed and protruding, ×900. (B): Fascicles arising directly from the mycelium which penetrates in the substratum. The rough crystals covered on the upper parts of the fascicles are often preserved in the gelatinized or disintergrated context, ×900. (C): A portion of the fascicle hyphae aseptate, ×2300. (D)-(E): Hyphae revived from the surface of the basidiocarp, ×2300. (F): Paraphysate hyphae, ×2300. (G) and (I): Basidia, ×2300. (H): Basidiospores, ×2300. (J): Hyphae with clamp connections, ×2300. All figs. based on No. 3781.

Microscoopic characters: Basal layer of context absent, or with a few parallel hyphae; intermediate layer of context of densely gelatinized interwovened hyphae, opaque, indistinct, embedded numerous encrusted hyphal pegs, yellowish brown at base or next to the substratum from which the hyphal pegs arising; hyphae 1.8-2.5 μm wide, thin-walled, smooth, with clamp connections found on the surface of exposed hyphal pegs from which the renewed hyphae occurred; hyphal pegs composed of parallel, compact slightly thick-walled, yellowish to yellowish brown hyphae, encrusted on the upper half, pine-tree-like, 37-50 μm wide at base, 50 μ long, with the individual fascicle hyphae 2-6.3 μm wide, 10-12 each hyphal peg in surface view or in longitudinal sections; hymenium 15 μm thick, with paraphyses and basidia arranged in dense palisade; basidia slender, clavate, 4-5×25 μm, with 4 basidiospores; sterigmata straight or slightly curved, 4-6 μm long; basidiospores narrowly ellipsoid, narrowly toward base, slightly flatten on one side, (2.3)-3-(3.2) ×(3.5)-6-7.5-(8) μm, apiculate, sometimes attached with the upper part of the wilted sterigma, smooth, thin-walled, non-amyloid.

Distribution: Cuba, Guadeloupe, Jamaica, Brazil, Tonkin, Malaya, the Philippines and Taiwan.

Specimen examined: Taitung Hsien, Lanyu Hsiang, Langdau Tsun, under a pure stand forests of *Ficus* sp., on the peak on the mountain facing toward sea, alt. 150-200 m, Aug. 26, 1975, S. Lin (NTU-3781).

The collection from Orchid island is quite similar to the species, *G. lineata* Berk. et Curt., widely distributed in the tropical areas of the world. Although our specimen has slight differences in spore size and thickness of the fruit bodies, we do not think it is necessary for us to establish a new taxon.

2. *Gloeocystidiellum lactescens* (Berk.) Boidin Fig. 2

C. R. Acad. Sci., Paris **233**: 1668, 1951; —*Corticium lactescens* Berk., Outl. Brit. Fung. p. 274, 1860; —*Corticium Brinkmanni* Bres., in Brinkmann, Westfül. Prov.-Ver. f. Wiss. u. Kunst Jahr. **26**: 128, 1898; —*Gloeocystidium lactescens* (Berk.) Hochn. et Litsch., K. Akad. Wiss. Wien Sitz. **116**: 784, 1907; —*Megalocystidium lactescens* (Berk.) Jülich, Persoonia **10**(1): 140, 1978; —*Thelephora lactescens* Berk. ap. Smith, Eng. Fl. **5**: 2, p. 169, 1836.

Macroscopic characters: Basidiocarps resupinate, widely effused, forming elliptic areas, adnate, 125-140 μ thick, 1-3×2-7 cm, even, more or less felted, cartilaginous or soft coraceous, sometimes thinly mucoid on the surface of rotten wood (not on barks) when dry, cream buff, chamois or cinnamon-buff, turning black in 5% KOH; margins thining out, fabrinose or membranaceous, white.

Microscopic characters: With the differentiation of the basal layer and intermediate layer; basal layer of context of densely interwovened parallel hyphae, 17.5-25 μm thick; mediate intermediate layer of context of scanty erect hyphae, obscure, mostly occupied by gloeocystidia arranged in dense palisade forming the main element of the intermediate layer and hymenial layer, 100-115 μm thick, with large rounded masses of crystals in one layer between the intermediate and basal layer; hyphae 2-3 μm wide, branched, thin-walled, smooth, septate, without clamp connections, more or less gelatinized; gloeocystidia cylindrical, flexuous, somewhat broader at base, not protruding, 7.5×75-88 μm, strongly stained by phloxine, forming a palisade in both intermediate and hymenial layer; hymenial layer 50 μm thick, masked by gloeocystidia, indistinct; basidia clavate, slender,

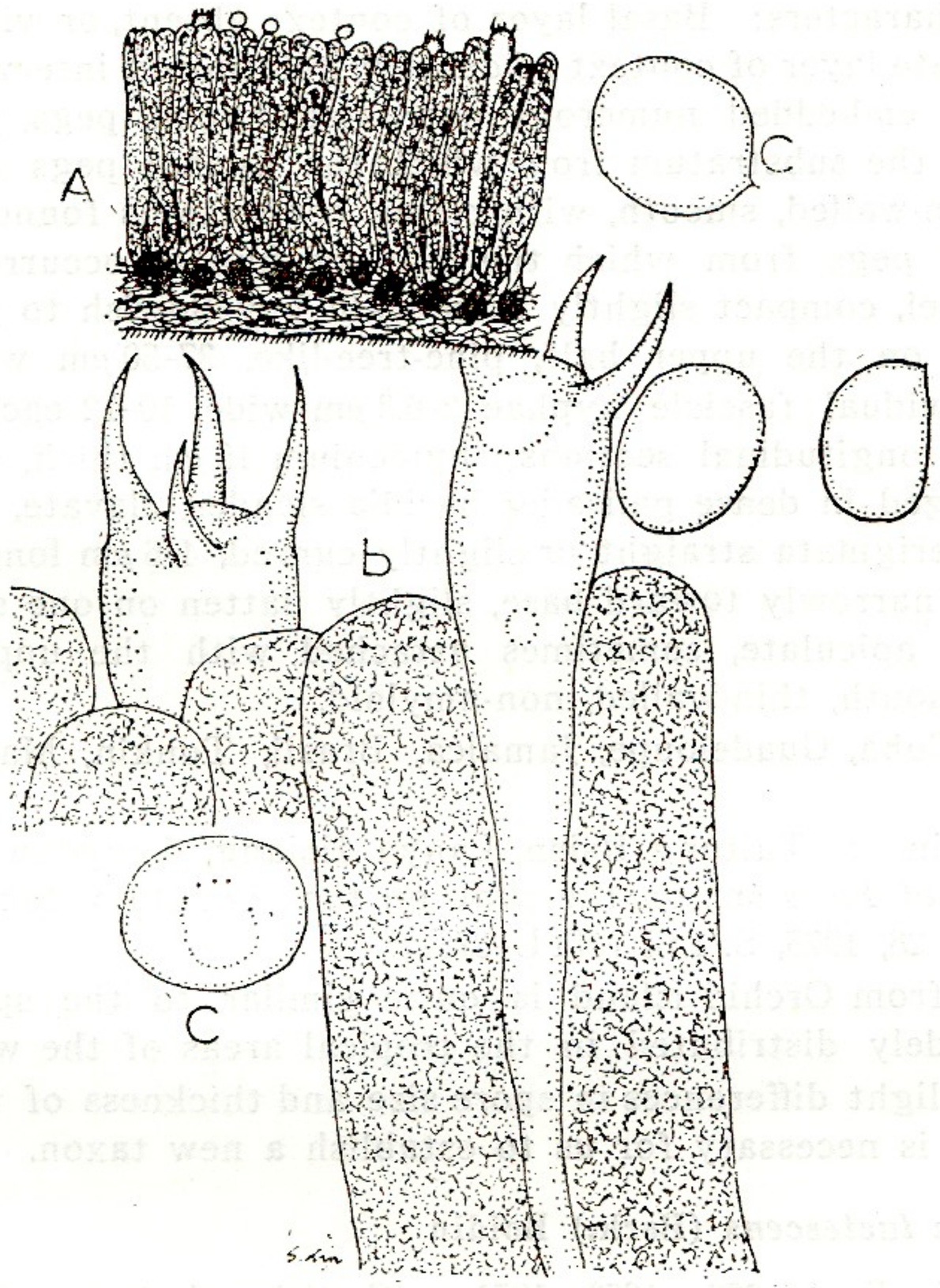

Fig. 2. *Gloeocystidiellum lactescens* (Berk.) Boid.

(A): Longitudinal section of basidiocarp showing a row of crystal masses embedded between the basal layer and the intermediate layer of context which is mainly occupied by the densely arranged erect gloeocystidia, ×225. (B): A part of hymenium consisting of gloeocystidia and basidia, ×2300. (C): Basidiospores, ×2300. All figs. based on No. 2567.

5-6×40-50 μm, protruding 7-8 μm high, with 4 basidiospores; sterigmata curved, 1 μm wide at base, 5 μm long; basidiospores elliptical, globose or subglobose, 5-6×6.2-7 μm or 5 μm in diam., thin-walled, smooth, apiculate, slightly amyloid.

Habitat: On the dead wood and fallen trunks of the broad-leaved trees, associated with white rot.

Distribution: Europe, America, Canada, England, Mexico, Porto Rico and Taiwan.

Specimen examined: Kauhsiung Hsien, the Southern Cross Highway, Kuaigu, on the dead wood and fallen trunks of broad-leaved trees, under the conifer and hardwood mixed forests, alt. 2600 m, Jan. 25, 1975, S. Lin (NTU-2567).

The wormlike gloeocystidia and the color change by KOH are the diagnostic features of this species. The texture on rotten wood is somewhat different from that on barks.

3. *Gloeocystiellum luridium* (Bres.) Boid. var. *microsporum* Z. C. Chen et S. H. Lin var. nov.

Fig. 3

A. *Gloeocystidiellum luridum* differt sporis minoribus.

Typus: S. Lin, NTU-3598.

Macroscopic characters: Basidiocarps resupinate, longitudinally effused, adnate, 60–110 μm thick, 0.8–1.5×18 cm, very thin to translucent, membraneous, even, not cracked grayish white, whitish marguerite yellow, sea-foam yellow to pale turtle green, bleached and becoming completely transparent in 5% KOH; margins thining out, pruinose, white.

Microscopic characters: Basal layer of context obvious, up to 60 μm thick, composed of densely compact parallel hyphae, transparent; intermediate layer of context indistinct or absent, almost occupied by gloeocystidia; hyphae 1.5–2 μm thick, gelatinized, thin-walled, with clamp connections, smooth; gloeocystidia crowded in intermediate layer and hymenial layer, forming a dense palisade, arising from the thick basal layer, slightly flexuous, cylindrical, scarcely or not projecting,

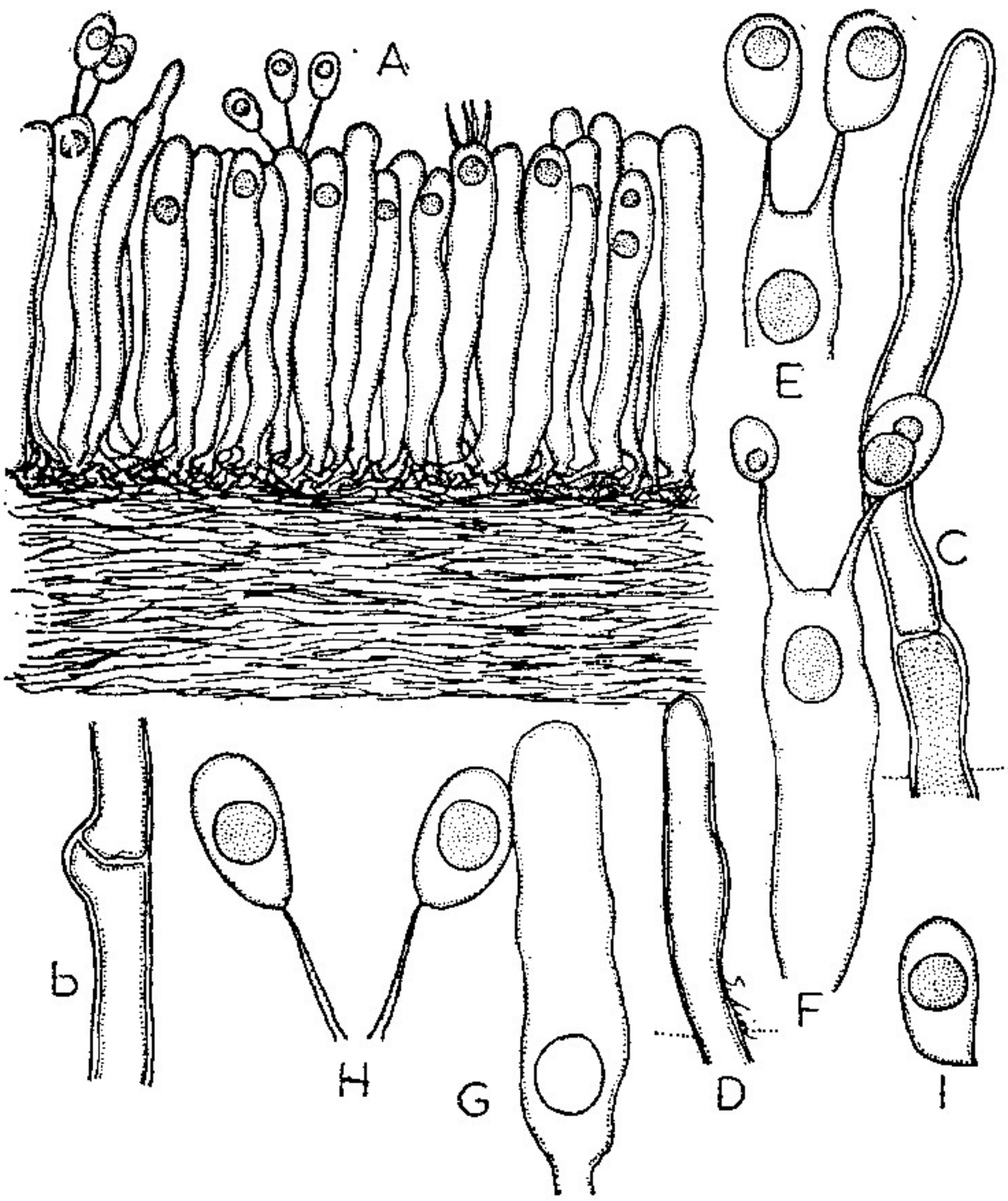

Fig. 3. *Gloeocystidiellum luridum* (Bres.) Boid. var. *microsporum* Chen & Lin

(A): Longitudinal section of the basidiocarp, ×900. (B): Hypha, ×2300. (C): Gloeocystidium, ×2300. (D): Protruding cystidium, ×2300. (E)-(F): Basidia and basidiospores, ×2300. (G): Paraphysis, ×2300. (H)-(I): Basidiospores 1-guttulate, ×2300. All figs. based on No. 3598.

rounded at apex, sometimes septate at base, 2.5-5×10-35 μm; hymenial layer 20-30 μm thick, indistinct; basidia 4-5×10-20 μm, cylindrical, slightly flexuous, with 2-4 basidiospores; sterigmata straight, 4-5 μm long; basidiospores faintly blue in Melzer's reagent, ellipsoid, more or less depressed on one side, 3-3.5×5-6 μm; thin-walled, smooth, apiculate, l-guttulate, amyloid.

Habitat: On dead branches of broad-leaved trees, associated with white rot.

Distribution: Taiwan.

Specimen examined: Taipei Hsien, Wulai Hsiang, from Orchid Valley to Mt. Suchuanlo, on the road side, under the hardwood forests, alt. 400-500 m, Dec. 7, 1975, S. Lin (NTU-3598).

The appearance, size and color of the fruit bodies and the character of the basidiospores of this species are very similar to those of *Corticium boninense* S. Ito et Imaz. from Bonin Island, but the latter species lacks the ancillary organs in context. This species is also very closely allied to *Gloeocystidiellum lactescens* (Berk.) Boidin in many aspects, except for the latter having larger spores, broader gloeocystidia, thicker fructifications and clamp connections absent. We can not be sure if the gloeocystidia of this species are radicate or not. But, from the presence of septa at the thin-walled base of the gloeocystidia, it might be reasonable to say that the gloeocystidium is generating from the terminal end of a lateral branch of basal hypha or directly from the basal hypha. In general, this taxon is identical to *Gloeocystidiellum luridum* in many aspects except rather thin basidiocarp and smaller basidiospores. Lin (1976) treated this taxon as new species, *G. Taiwannense* sp. nov. In this revisional treatment, it is placed as a new variety of *G. luridum*.

4. ***Hyphoderma praetermissum*** **(Karst.) Erikss. & Strid.** Figs. 4, 5

The Corticiaceae of N. Europe, **3**: 505, 1975; —*Hyphoderma tenue* (Pat.) Donk, Fungus **27**: 15, 1957; —*Corticium praetermissium* Karst., Bidr. Känned. Finl. Nat. Folk. **48**: 423, 1889; —*Corticium tenuis* Pat., Rev. Mycol. **7**: 152, 1885; —*Peniophora praetermissa* (Karst.) Burt, fide Rogers and Jackson, Farlowia **I**: 322, 1943; —*Corticium torquatum* Cunningham, Trans. Roy. Soc. New Zel. **82**: 283, 1954.

Macroscopic characters: Basidiocarps resupinate, effused, adnate, 100-350 μ thick, 0.5-2×5-20 cm, ceraceous or membranaceous, even, not cracked, white, marguerite yellow to cream color, turning cream buff in 5% KOH; margins thining out, pruinose or tomentose, white.

Microscopic characters: Basal layer with a few or much thicker parallel hyphae, up to 50 μm thick, loosely or densely parallelly arranged, with the lateral hyphae ascending in right angle; intermediate layer of context more or less distinctive, with clamp connections; leptocystidia protruding, interwovened, about 75 μm thick; hyphae 2.5-3 μm thick, thin-walled, smooth, 12.5-30 μm high, 6.3 μm wide, cylindrical, thin-walled, smooth, rounded or capitate at apex, slightly attenuate, arising from subhymenium, with wall thicker than gloeocystinia, and wider than gloeocystidia in protruding portions; gloeocystidia long obclavate or cylindrical and attenuate toward apex, more or less flexuous, gradually broader downwards and swollen at base, 6-12.5×75-137 μm, not protruding or slightly protruding, with the protruding portions in 2.5-5 μm width, thin-walled, deeply stained by phloxine, smooth, arising from short lateral and vertical hyphae; stephanocysts (caliciform bodies) unequally two-globose-celled, in pyriform, 10×14 μm, with a girdle of 10 digitate processes around the septa between two cells,

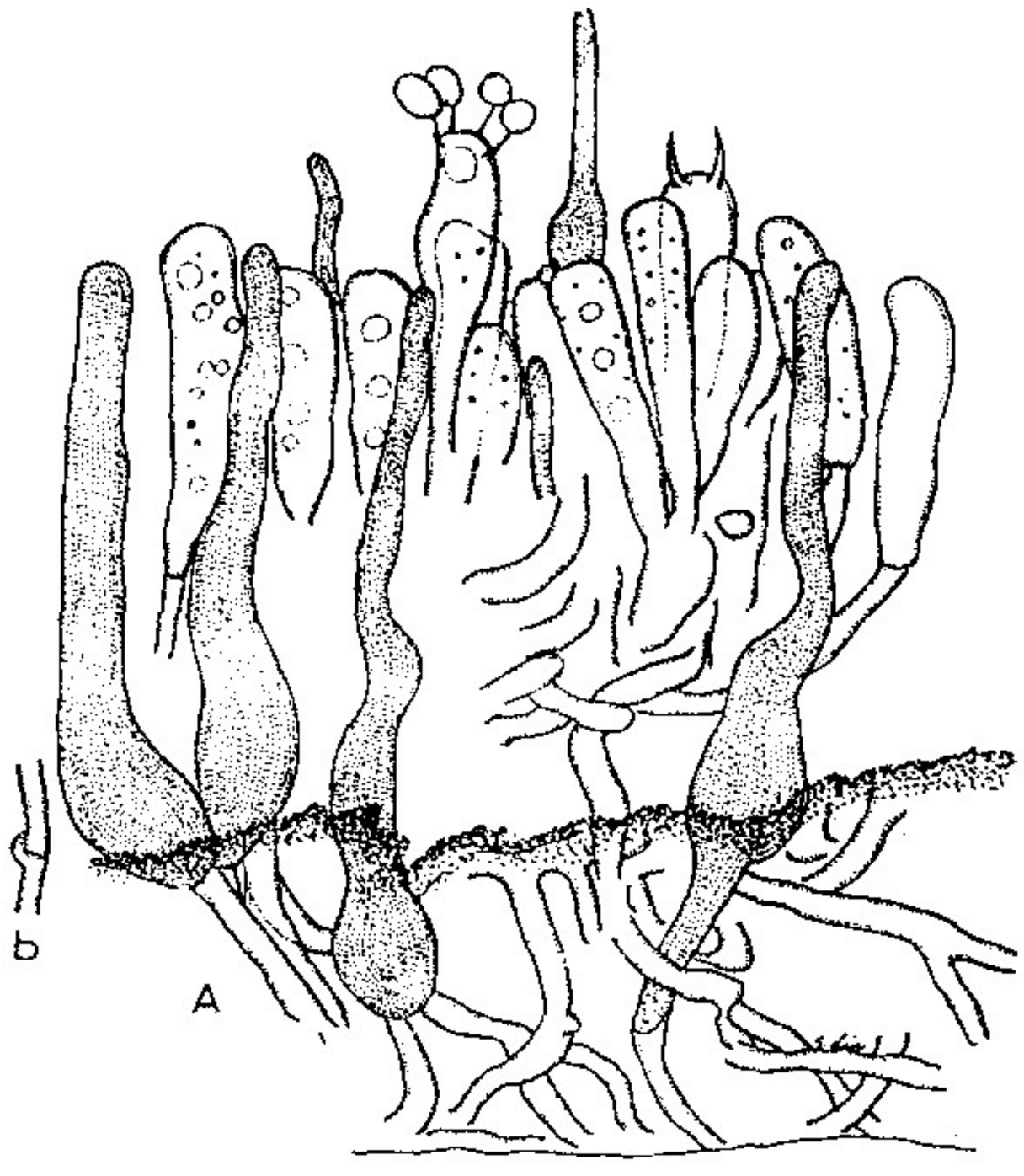

Fig. 4. *Hyphoderma praetermissum* (Karst.) Erikss. & Strid.

(A): Longitudinal section of basidiocarp showing the gloeocystidia, leptocystidia and the hymenium, ×616. (B): Hypha, ×616. All figs. based on No. 3156.

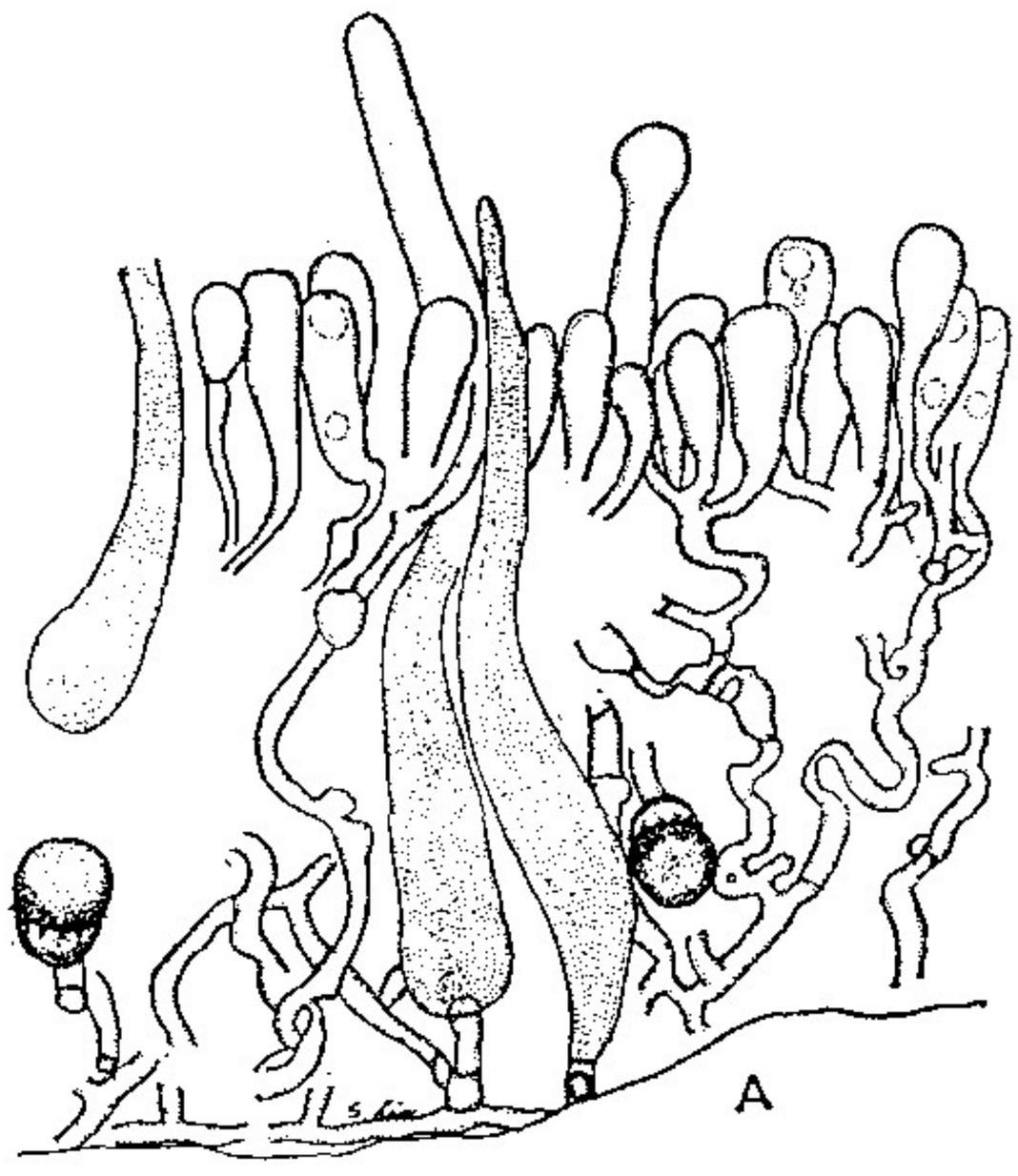

Fig. 5. *Hyphoderma praetermissum* (Karst.) Erikss. & Strid.

(A): Longitudinal section of basidiocarp showing the stephanocysts, gloeocystidia, leptocystidia and the hymenial layer, ×616. This fig. based on No. 3856.

and with the processes in 1–2 μm length, arising from lateral branches of basal paraphyses, gloeocystidia and leptocystidia in palisade; basidia 7.5–8.5×25–40 μm, subclavate, bearing 2–4 basidiospores; sterigmata curved, 5 μm long; paraphyses subclavate to cylindrical, 7.5×25 μm; basidiospores suballantoid to narrowly oblong, 4–4.5×8–10 μm, smooth, thin-walled, non-amyloid.

Habitat: On the dead branches of broad-leaved tree and wooden bridge, associate with white rot.

Distribution: Europe, North America, Australia, New Zealand and Taiwan.

Specimens examined: Taipei Hsien, Pinlin Hsiang, from Orchid Valley to Mt. Suchuanglo, on the road slide, under the hardwood forests, associated with *Poria* sp., alt. 400–500 m, Dec. 7, 1975, S. Lin (NTU-3156), on the wooden bridge, under the hardwood forests, alt. 400–500 m, Dec. 7, 1975, S. Lin (NTU-3158); Taipei Hsien, Mt. Seven-star, on the road side, under the hardwood forests, alt. 700 m, Dec. 6, 1975, S. Lin (NTU-3856).

The species has three kinds of cystidia; leptocystidia, gloeocystidia and stephanocystidia. The leptocystidia are arising from subhymenium, frequently protruding, in cylindrical shape, rounded or capitate at apex, thin-walled but thicker when compared with gloeocystidia, and often empty without contents, thus easily confused with protruding gloeocystidia. The gloeocystidia are densely immersed in context, elongated, cylindrical and swollen at the base, arise from lateral branches of the basal hyphae, and have contents easily stained by phloxine. According to Price's observation, the gloeocystidia did not darken in sulfoaldehyde solution. The stephanocysts are only found in the thin fructification of one specimen (NTU-3856) of our collections. It may be reasonable to say that the occurrence of the stephanocysts in thin fructification may relate with the loose structure of the context of the thin and young fructification. In the specimen studied stephanocysts were found at the basal layer of context, although Price (1973) described that they were distributed throughout the fructification, i.e. in the contentext and hymenium. However, we agree with his opinion that the stephanocysts is probably a peculiear form of gloeocystidium. Rogers and Jackson (1943) also found that there were numerous intergrading structures connecting caliciform bodies (stephanocysts) with simple globoid gloeocystidia.

Between *Hyphoderma praetermissum* and *Corticium torquatum*, we find no critical difference. Therefore, we reduce *C. torquatum* as a synonym of *H. praetermissum*. Stephanocysts and leptocystidia are diagnostic features for distinguishing this species from others. But when the stephanocysts have not yet formed in the fructifications, it is easy to misidentify.

5. ***Hyphoderma sambuci* (Pers. ex Pers.) Jülich** Fig. 6

Persoonia 8: 80, 1974; —*Hyphodontia sambuci* (Pers.) John Erikss., Symb. Bot. Ups. **16**(1): 104, 1958; —*Corticium sambuci* Pers., Roemer Neues Mag. Bot. 1: 111, 1794; —*Thelephora sambuci* (Pers.) Pers., Syn. Mith. Fung. p. 581, 1801; —*Hypochnus sambuci* (Pers.) Sacc., Syll. Fung. **6**: 656, 1888; --*Peniophora sambuci* (Pers.) Burt, Ann. Mo. Bot. Gard. **12**: 233, 1926; —*Corticium hariotii* (Bres.) Parm., Consp. Syst. Cort. p. 122, 1968; —*Hyphodontia hariotii* (Bres.) Parm., Consp. Syst. Cort. p. 122, 1968; —*Peniophora thujae* Burt, Ann. Miss. Bot. Gard. **12**: 236, 1925.

Macroscopic characters: Basidiocarps resupinate, effused, adnate, 80–170 μm thick, 0.7–2×2–8 cm, cretaceous to pelliculose, cracked strongly, pruinose, downy in appearance, even, white, chalk-white to light buff (NTU-2651, 4285), cartridge buff

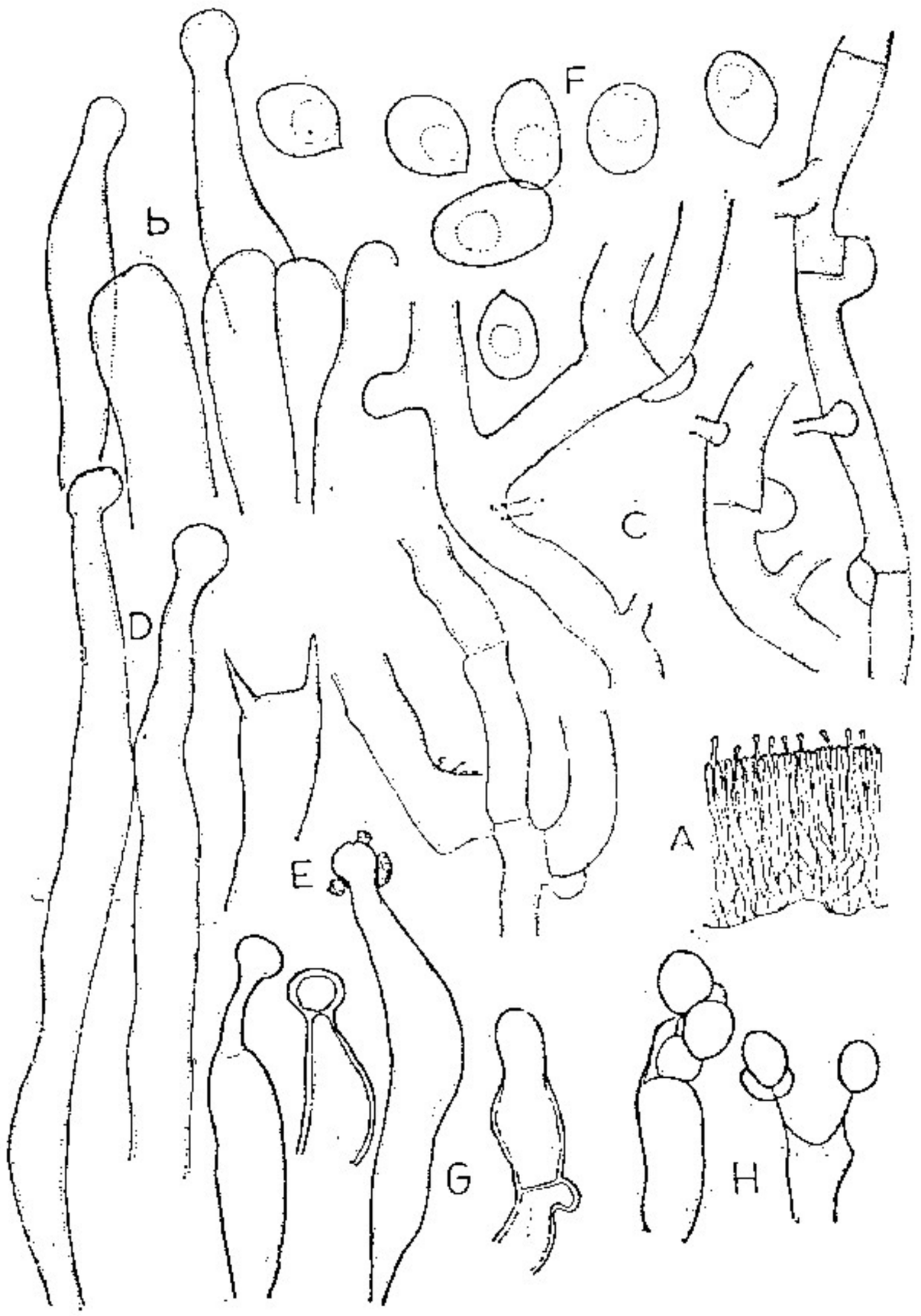

Fig. 6. *Hyphoderma sambuci* (Pers.) Jülich

(A): Longitudinal section of basidiocarp, ×65. (B): A portion of hymenium showing cystidia and paraphyses, ×1584. (C): Hyphae, ×1584. (D): Cystidia protruding, ×1584. (E): Immature basidium with two sterigmata, ×1584. (F): Basidiospores, ×1584. (G): Cystidia, ×1118. (H): Basidia and basidiospores, ×1118. Figs. A-F based on No. 4285; G-H on No. 2651.

(NTU-4283), not changing color in 5% KOH or slightly turning pale yellow in 5% KOH; margins thining out, floccose to tomentose, white or concolorous.

Microscopic characters: Without basal layer of context or with a few parallel hyphae at base of context; context of longitudinally loosely interwovened hyphae; hyphae distinctive, 2–4 μm wide, thin-walled, smooth, with large clamp connections, gradually densely arranged from base towards subhymenium; cystidia cylindrical, attenuate upwards, but abruptly swelling at tips in glabose shape, thin-walled, smooth, aseptate, sometimes encrusted but the crystals dissolved in KOH, with the capitate tip 3 μm in diam., or 3.5×4 μm, with the neck 1.5–2×2–5 μm, with the lower portions 5×12–35 μm, sometimes with clamp connections at base, mostly protruding 12–22 μm high; hymenial layer even, compactly arranged, 25–35 μm thick; basidia subclavate to cylindrical or subutriform to slightly constricted at middle portions, 3.2–5×10–30 μm, with 2–4 basidiospores; sterigmata slender, 1–1.2 μm wide at base, 3–5 μm long, straight; basidiospores ellipsoid, oval, 4×6 μm, smooth, thin-walled l-guttulate, apiculate non-amyloid.

Habitat: On dead branches of the broad-leaved trees and the barks of Taiwan red pine (NTU-2694), *Pinus taiwanensis* Hayata.

Distribution: Europe, North America, New Zealand, Kamchatka Peninsula, Japan and Taiwan.

Specimens examined: Kaohsiung Hsien, the Southern Cross Highway, Tutsang, under the conifer and hardwood mixed forests, alt. 2600 m, Jan. 1975, S. Lin (NTU-2651); Yaco, on the open area, on the trunks of Taiwan red pine, alt. 2600-3550 m, Jan. 25, 1975, S. Lin (NTU-2694); Taipei Hsien, Wulai Hsiang, Doll Valley, on the road side, under the hardwood forests, alt. 300-400 m, Dec. 25, 1975, S. Lin (NTU-4283, 4285).

The cystidial form is a good mark of this species. In addition to it, the ovate spores, the strongly cracked and chalky basidiocarps are also of the important associated features. The species seems to be very similar to *Odontia pelliculae* Furukawa in the cystidial shape, spore shape, hyphae and the texture of the context except the latter species having odontoid spines and smaller basidiospores.

6. ***Hyphoderma setigerum* (Fr.) Donk** Figs. 7, 8

Fungus **27**: 15, 1957; —*Thelephora aspera* Pers., Myc. Eur. **1**: 1182, 1916; —*Thelephora setigera* Fr., Elench. Fung, 1: 208, 1828; —*Kneiffia setigera* Fr. Epicrisis, p. 529, 1836-1838; —*Corticium berkeleyi* Cke. ex Mass., Journ. Linn. Soc. Bot. **27**: 133, 1890; —*Peniophora setigera* (Fr.) Bres., Hym. Fung. Kmet. p. 40, 1897; —*Odontia acerina* Peck, N.Y. State Mus. Rep. **53**: 847, 1900; —*Peniophora aspera* (Pers.) Sacc., Flora Italica, Cryptogamia **1**: 1182, 1916; —*Odontia versiculosa* Burt ex Povah, Pap. Mich. Acad. Sci. **9**: 262; 1929;—*Odontia setigera* (Fr.) Miller, Mycologia **26**: 19, 1934.

Macroscopic characters: Basidiocarps resupinate, effused, adnate, 100-200 μm thick, 300 μm thick when including spines, 1.2-1.5×2-9 cm‘ not cracked, indurate or odontoid, white, light buff, cream color or colonial buff, not changing color in 5% KOH, pelliculose, minutely granulate; margins thining out, pruinose, concolorous; spines conical.

Microscopic characters: Basal layer without parallel hyphae, if any, extremely loose, and very scanty, mostly slowly ascending; intermediate layer of context with loosely wovened hyphae at base, gradually dense and longitudinally interwovened upwards; hyphae of basal layer of context 3-6 μm wide, thick-walled, with clamp connections; hyphae of intermediate layer of context 2.5-3-4.5 μm wide, cylindrical, sometimes slightly ampoullaceous, thin-walled, smooth, distinctive, with contents turning brown color in Melzer's reagent, having abundant clamp connections, branching in narrow angles; cystidia easily stained by phloxine especially when young before projecting, confined to the spines in axile, protruding 17.5-37.5 μm high, arising from the basal hyphae, 63-150 μm long, 6.2-7.5 μm wide, septate or with clamp connections, slightly encrusted, 7.5-8.8×10-17.5 μm each cell, cylindrical, straight, rounded or obtuse at apex, thin-walled; hymenium 30 μm thick, with basidia and paraphyses arranged in palisade; basidia 20-27× 5-7 μm, clavate but constricted near apex, with 2-4 basidiospores; paraphyses cylindric, swelling at middle portions, 4.5-5×25-27 μm, l-guttullate; sterigmata curved, 1-1.5×4-6.5 μm; basidiospores oblong or ellipsoid to cylindrical with rounded apices, apiculate, 3-4.5×5-11 μm, l-guttullate, thin-walled, smooth, non-amyloid.

Habitat: On the dead branches of the broad-leaved trees, associated with white rot.

Distribution: Europe, Great Britain, North America, Australia, New Zealand,

USSR, Japan and Taiwan.

Specimens examined: Kaohsiung Hsien, the Southern Cross Highway, Mt. Mei, under the hardwood forests, alt. 900 m, Jan. 24, 1975, S. Lin (NTU-2391); Nantou Hsien, Wuso, Meifung, under the pine forests, alt. 2000 m, Nov. 1, 1975, Z. C. Chen (NTU-3582); Taitung Hsien, Lanyu Hsiang, on the road side, under the tropical hardwood forests, alt. 50-200 m, Aug. 24, 1975, S. Lin (NTU-3916); Taipei Hsien, Mt. Yangming, under the harwood forests, alt. 500 m, Dec. 27, 1975, S. Lin (NTU-4258).

According to the reports of Slysh (1960), Cunningham (1963) and Hayashi (1974), the variational scope of the species seems to be very broad, which may coincide with its cosmopolitan distribution. Our materials also show the same case. We follow the opinion of Donk (1957) and accept the concept of the genus *Hyphoderma* Wallroth (1833) which was emmended by Donk in 1957.

The hymenophore varies from smooth to odontoid. And the encrusted cystidia of the species are only present in spines. These characters of the species, therefore, show itself an intermediate form of both genera *Hyphoderma* and *Odontia*. Price (1973) in his study of the morphology of resupinate Aphyllophorales and their development of the cystidia, hyphae, basidia and whole fructifications, concluded that the mature fructifications of *Hyphoderma setigerum* are often slightly hydnoid, and said that this may result from the fructifications building up around a projecting cystidium. Although the spine appears odontoid, the

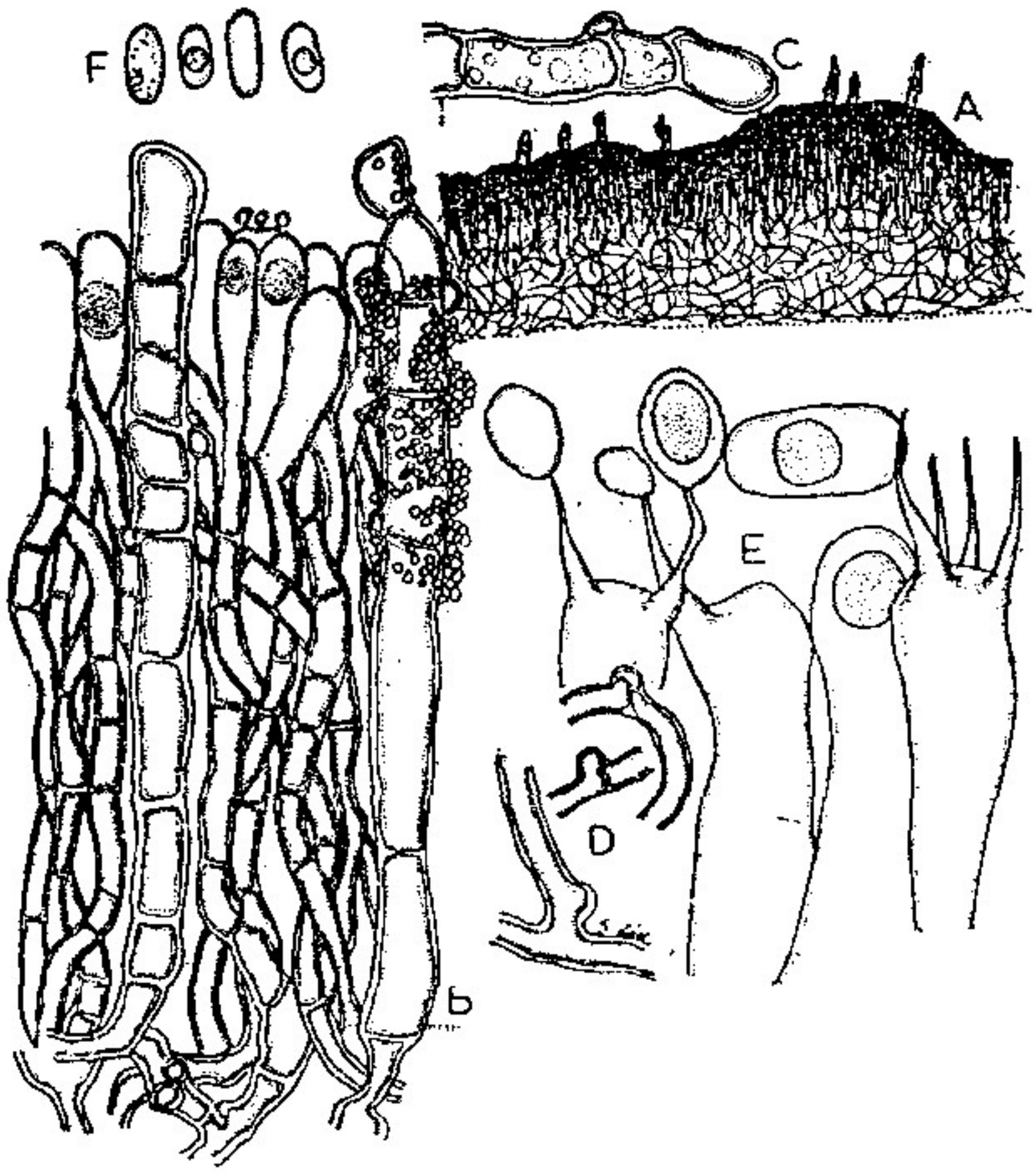

Fig. 7. *Hyphoderma setigerum* (Fr.) Donk

(A): Longitudinal section of basidiocarp, ×65. (B): Hymenial layer and a part of the intermediate context consisting of vertically interwovened hyphae and cystidia, ×616. (C): Protruding cystidium, ×616. (D): Hyphae, ×616. (E): Basidia and basidiospores, ×1584. (F): Basidiospores, ×616. All figs. based on No. 3916.

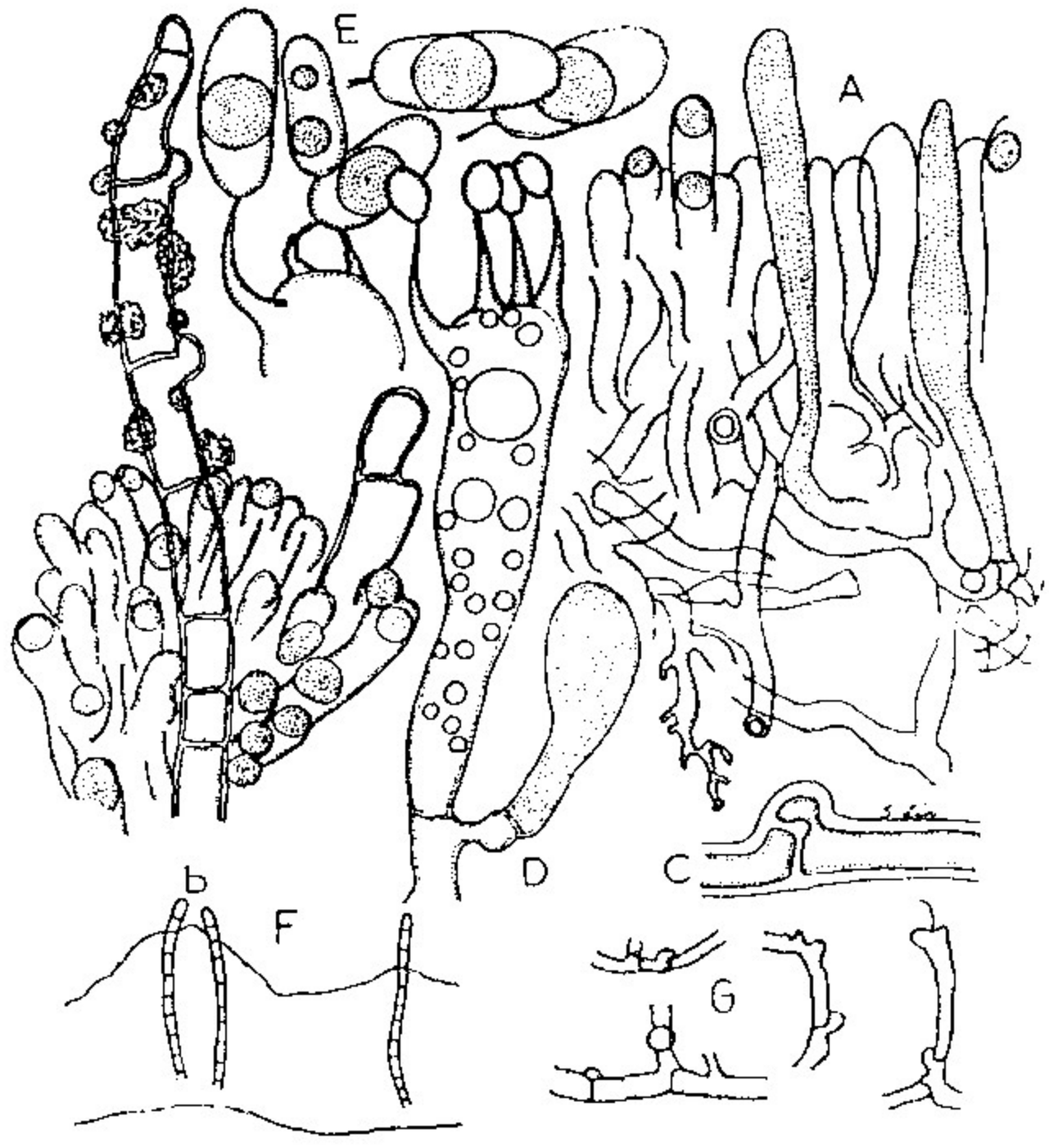

Fig. 8. *Hyphoderma setigerum* (Fr.) Donk

(A): Hymenial layer and upper context showing the young protruding cystidia, ×616. (B) spine showing the encrusted cystidium with clamp connections, ×616. (C): Hypha, ×1584. (D): Paraphysis and basidium, ×1584. (E): A part of basidium and its basidiospores, 1584. (F): Longitudinal section of basidiocarp, ×65. (G): Hyphae in the lower context, ×444. Figs. A-E based on No. 3582; E-G on No. 2391.

protruding hyphocystidia remain dissociated from the sterile hyphae by which the typical fimbriate tips of spines are organized. And even if the hyphocystidia are associated with climbing hyphae and forming odontoid spines, they still can not belong to the typical ones, because the occurrence of the sterile climbing hyphae is fundamentally different from that of the sterile hyphae in typical odontoid spines.

7. ***Hyphodontia aspera*** **(Fr.) J. Erikess.** Fig. 9

Symb. Bot. Ups. **16**: 1, p. 104, 1958; —*Grandinia aspera* Fr., Hym. eur. p. 627, 1874; —*Odontia aspera* (Fr.) Bourd. & Galz. Hym. Fr., p. 428, 1927.

Macroscopic characters: Basidiocarps resupinate, effused, forming linear area or irregularly orbicular area, with many small isolated rounded islands, adnate, 80–800 μm thick, 1.2×8 cm, ceraceous or membranaceous, uneven, odontoid, finely cracked, more or less in crashed manners, marguerite yellow, but cream buff at the center, not changing color in 5% KOH; margins thining out; floccose, white or concolorous; spines odontoid, conical, abruptly sharp at apex, with fimbriate tips, 60×70 μm, 6–9 per mm.

Microscopic characters: Basal layer of context almost none; the basal part of the intermediate layer 7–200 μm thick, of very loosely interwovened and more

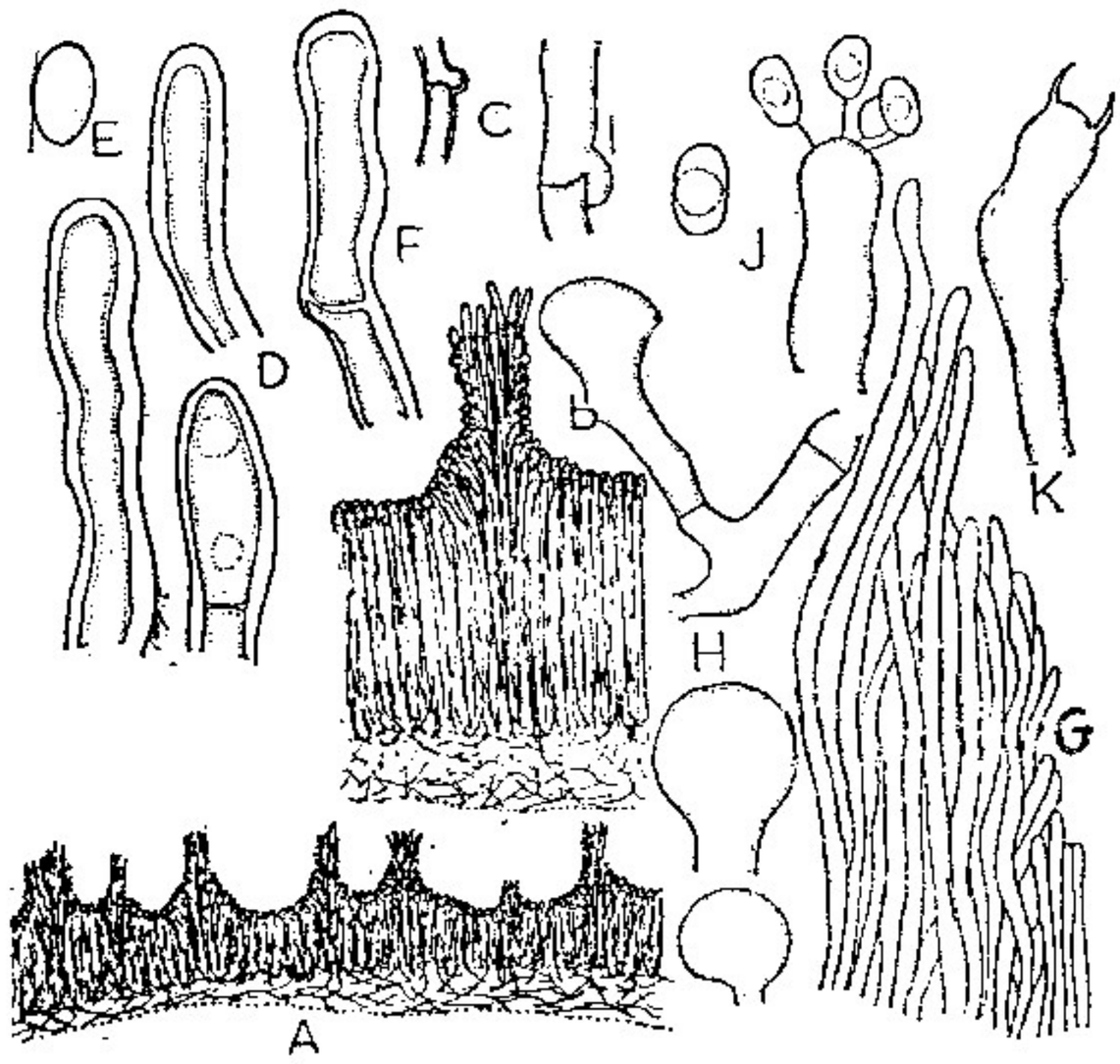

Fig. 9. *Hyphodontia aspera* (Fr.) J. Erikss.

(A): Longitudinal section of basidiocarp showing the loosely interwovedned hyphae of the basal context and the longitudinally erect hyphae of the intermediate context, ×62. (B): A part of fig. A showing the fimbriate tip of spine, ×154. (C): Hypha, ×616. (D): Cystidia of the fimbriate tip of spine, ×1584. (E): Basidiospore, ×1584. (F): Paraphysis, ×1584. (G): Spine showing the cystidia in the tip, ×444. (H): Lateral hyphae with with swollen ends, ×1118. (I): Hypha, ×1118. (J): Basidium and basidiospores, ×1118. (K): Basidium, ×1118. Figs. A-F based on No. 3509; G-K on No. 2889.

or less parallel hyphae; the upper part of the intermediate layer more than 100 μm thick, sometimes up to 700 μm thick, of very longitudinally interwovened dense hyphae 2-3 μm wide, distinctive, with clamp connections, smooth, thin-walled, sometimes swelling at the end of short lateral hyphae; cystidia cylindrical, septate or aseptate, slightly thick-walled, rounded at apex, 2.5-3 μm wide, confined to the tips of spines forming fimbriate manner, arising from the specialized terminal hyphae of trama of spines; hymenium 15 μm thick, with basidia arranged in palisade; young basidia cylindrical, 3×15 μm; basidiospores elliptical, 3×5 μm, smooth, thin-walled, non-amyloid.

Habitat: On dead twigs of the broad-leaved trees.

Distribution: Europe, North America, USSR, Japan, and Taiwan.

Specimens examined: Taipei Hsien, Pinlin Hsiang, from Orchid Valley to Mt. Suchuanglo, on the road side, under the hardwood forests, alt. 400-500 m, July 23, 1975, S. Lin (NTU-2889), July 24, 1975, S. Lin (NTU-3509).

8. ***Hyphodontia crassa* sp. nov.** Figs. 10, 11

Basidiocarpi resupinati, crassi, dense tomentosi, molles, parum adnati, pulvinati, albi vel pallide ochroleuci, 1-1.5 mm crassi, sine margine; spinae elongatae et aggregatae; hyphae plerumque crasse tunicate, abunde noduloso-septatae, 3-5 μm latae, parietibus 1 μm crassibus, minute incrustatae; cystidia protrudens, hyphae similis, rotundata apice, dense minute incrustata, noduloso-septata; chlamydosporae ad apices hypharum exorientes, ellipticae vel subglobosae, 3-7 μm diametero vel

4.8×4 μm, basidia subclavata-cylindracea, media constricta, 3-4 μm in diam., 2-4 sterigmatibus; sporae ovoideae, leves, tenuitunicatae, uniguttulatae, nonamyloideae, 4.5-5×4 μm.

Holotypus: TAIWAN: Taipei Hsien, Pinling Hsiang, Dec. 7, 1975, S. Lin (NTU-3155).

Macroscopic characters: Basidiocarps resupinate widely effused, adnate, 1.5-5× 3-16 cm, 300 μm or 1-1.5 mm thick, soft, membranaceous, sometimes separable, white, naphthalene yellow, ivory yellow, cream color or marguerite yellow, not changing color in 5% KOH, uneven, covered with dense granules in various connection at base, not cracked; margins thining out or without, distinctly pruinose or arachnoid, white or concolorous; Spines odontoid, from short to very long, aggregated without definite shapes, dense, about 60 μm wide, 120 μm high.

Microscopic characters: Basal layer of context 75-100 μm thick, composing of very loosely interwovened distinct hyphae; intermediate layer of context including spines 200 μm thick, conglutinized by crystals and forming a black zone of context, of much densely longitudinally interwovened indistinct encrusted or smooth hyphae; hyphae of two kinds; the one thick-walled, 5 μm wide, with wall in 2 μm thickness, without or with rare clamp connections, smooth, slightly to densely encrusted; the other hyphae thin-walled, 3-5 μm with numerous clamp connections, seemingly arising from the extension of the end of thick-walled hyphae often having intermediate thick-walled hyphae; chlamydospores thin- or thick-walled, elliptical or globose, easily stained by phloxine, 3-7.5 μm in diam., arising from

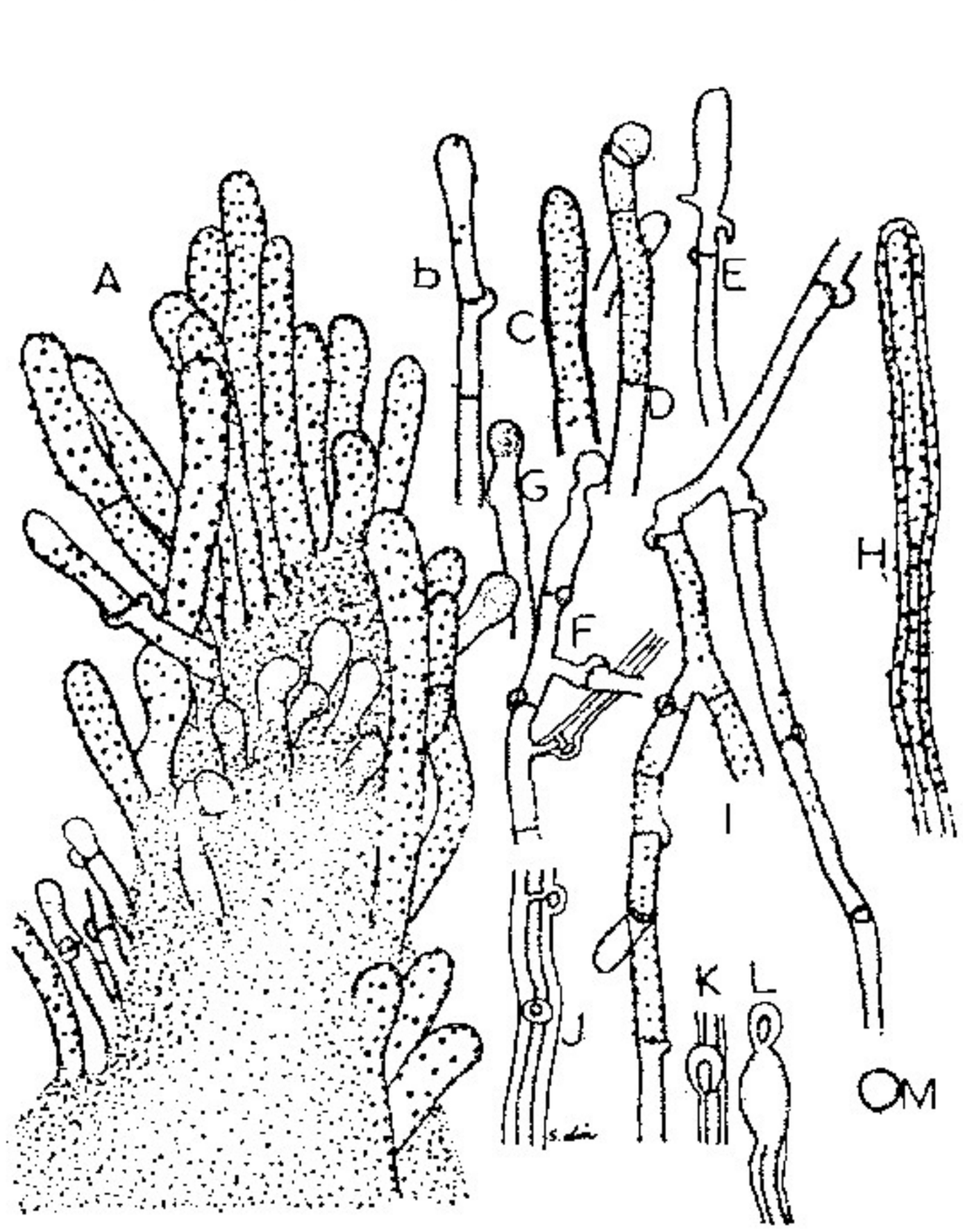

Fig. 10. *Hyphodontia crassa* sp. nov.

(A): Spine, ×616. (B)-(H): Cystidia and chlamydospore-bearing hyphae in spine, ×616. (I)-(K): Hyphae, ×616. (L): Chlamydospore-bearing tip of hypha in context, ×616. (M): Detached chlamydospore having a remnant on the abscissional zone, ×616. All figs. based on Holotype, No. 3155.

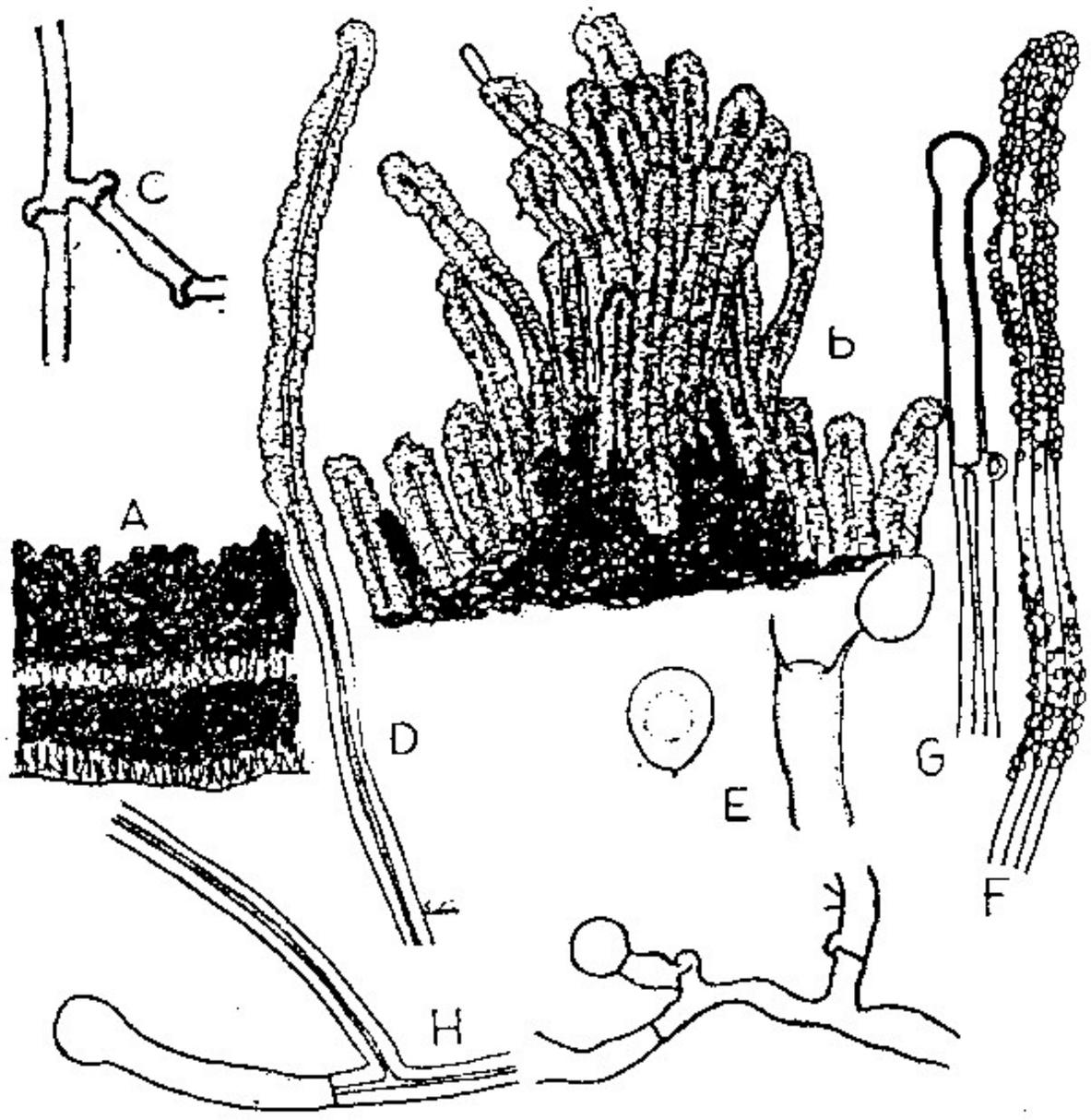

Fig. 11. *Hyphodontia crassa* sp. nov.

(A): Longitudinal section basidiocarp, ×45. (B): Longitudinal section of spine, ×616. (C): Hypha, ×616. (D) and (F): Cystidia, ×616. (E): Basidium and basidiospores, ×1584. (G)-(H): Hyphae with terminal vesicles (young chlamydospors) in the trama and intermediate layer of context, ×616. Figs. A-E based on No. 4279; F-H on No. 3141.

the tips of thin-walled hyphae, scattered and immersed in the context when mature, sometimes with scars of abscission zones; cystidia cylindrical, loosely or densely encrusted in long distance, 4-7.5×112.5 μm, 3-5 μm wide when excluded crystals, protruding, straight, rounded at apex, forming spines in fimbiate manner at tips; basidia cylindrical or subslavate, 3-3.5 μm wide, with 2-4 basidiospores; basidiospores ovoid, 4×4.5-5 μm, smooth, thin-walled, sometimes having guttula, apiculate, nonamyloid.

Habitat: On dead stems of broad-leaved trees.

Distribution: Taiwan.

Specimens examined: Taipei Hsien, Pinlin Hsiang, from Orchid Valley to Mt. Suchuangro, under the hardwood forests, alt. 400-500 m, near a cement bridge, on the road side, Dec. 7, 1975, S. Lin (NTU-3155, Holotype: NTU-3141); Taipei Hsien, Wulai Hsiang, Doll Valley, along the road side, under the hardwood forests, alt. 300-400 m, Dec. 25, 1975, S. Lin (NTU-4270).

Macroscopically this new species is characterized by having amorphous spines. In general, the spines are subulate or cylindrical, but often fused side by side and forming the spathulate to irpiciform fence-like processes. This species is closely related to *Hyphodontia spathulata* (Fr.) Parm., *Hyphodontia barba-jovis* (Fr.) John Erikss., or *Hyphodontia verruculosa* John Erikss. & Hjortst. However, it can be distinguished from the allied species by thin- to thick-walled, encrusted hyphae and cystidia as well as presence of chlamydospores.

9. *Hyphodontia dimorpha* sp. nov. Figs. 12, 13

Basidiocarpi resupinati, effusi, adnati, membranacei, dontoidei, superficie alutacea vel cremea, rimosa; hyphae distinctae et densae, parietibus benuibus, afibulatae, septatae, 2-5 μm latae; cystidia biformis; typus unus cylindricus, fere laevis, septatus, pariete tenue, fimbriatus apice; typus alter fusiformis vel ventricosus, septatus vel aseptatus, pariete tenue vel crassa, subtiliter incrustatus, emergens vel inclusus, abundans in contextu; stratum basilare contexti praescens; basidia cylindricalia vel subclavata, 3.5-3.8×15 μm, basidiosporis 4; basidiosporae ellipticae et suppressae in latere unum, 1.2-1.8×3-3.2 μm, parietibus levibus, hyalinae, nonamyloidibus.

Holotypus: TAIWAN: Taipei Hsien, Wulai Hsiang, Doll Valley, Dec. 25, 1975, S. Lin (NTU-4303).

Macroscopic characters: Basidiocarps resupinate, widely effused, adnate, 400 μm thick including spines, 3-7×23 cm, membranaceous, finely but not completely cracked, odontoid to densely toothed, white, catridge buff, ivory buff or pale pinkish buff, not changing color in 5% KOH; margins thining out, with distinct young spines on farinose surface, white or concolorous; spines 70-250 μm wide at base, 70-120 μm long, cylindrical to conical.

Microscopic characters: Basal layer of context distinct, 70 μm thick, mostly of parallel hyphae, with distinct basal hyphae up to 5 μm wide, sometimes with

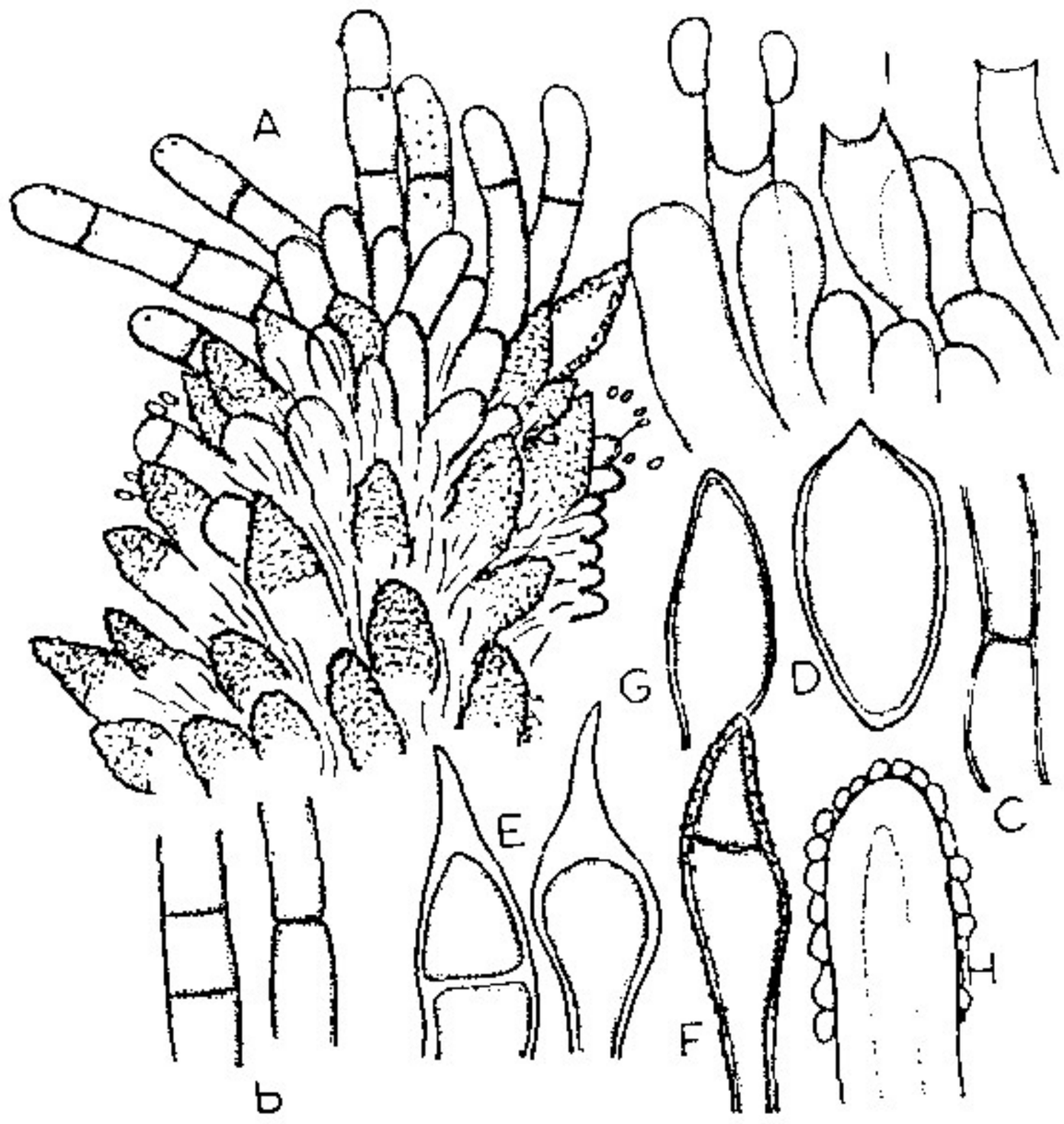

Fig. 12. *Hyphodontia dimorpha* sp. nov.

(A): Apex of spine showing the fimbriate cylindrical cystidia and fusiform encrusted cystidia, ×616. (B)-(C): Hyphae, ×1584. (D): Cystidium at the basal context, ×616. (E): Cystidia with the crystals dissolved, ×1584. (F): Finely encrusted cystidium with simple septum occurred in the intermediate context, ×616. (G): Cystidium protruding, ×616. (H): Cystidium with thick wall in 2 μm width and protruding in 15 μm height, cylindrical, showing its intermediate stage of both cystidial types, ×1584. (I): A part of hymenium showing basidia, paraphyses and basidiospores, ×1584. All figs. based on Holotype, No. 4303.

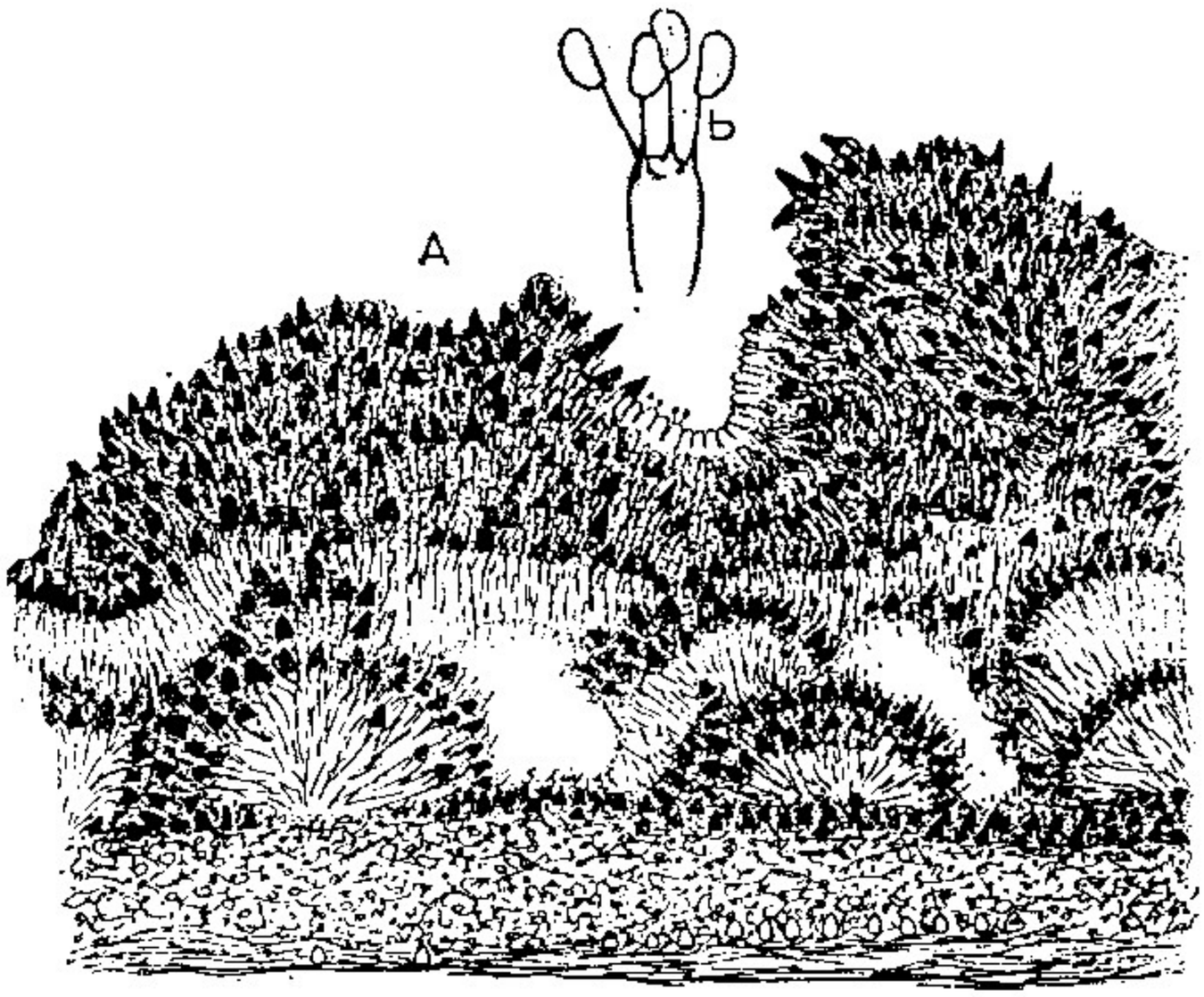

Fig. 13. *Hyphodontia dimorpha* sp. nov.

(A): Longitudinal section of basidiocarp showing the distinctive basal and intermediate layer of context. In the intermediate layer, numerous central cores are initiated. The cystidia are the excellent in indicator of the hyphal orientation, ×154. (B): Basidium and basidiospores, ×1584. All figs. based on Holotype, No. 4303.

short cells, 5×6 μm, thin-walled; intermediate layer of context thick, 200–240 μm thick, of vertically ascending hyphae; hyphae 2–3.5–(4) μm wide, rarely 5 μm wide at the basal layer, with simple septate, sometimes constricted at septa, thin-walled, smooth, often with short cells, 5×6 μm at basal layer, without clamp connections; cystidia with two types; the one fusiform or ventricose, finely encrusted, sometimes one-septate, 5–15 μm wide at intermediate layer, 11–17 μm wide at basal layer, 35 μm long, thin- to thick-walled, with the wall up to 7 μm wide, embedded abundantly in intermediate layer, with the crystals dissolved in 5% KOH, sometimes arranged in fan-shaped, often smooth, large, old, thin- to thick-walled, ovate at the basal layer protruding at the hymenial surface; the other cylindrical, rounded at apex, thin-walled, more or less of the sterile generative hyphae, fimbriate and protruding at the apex of spines, septate, without clamp connections, very scarcely finely encrusted, 5–5.5 μm wide, projecting 30 μm high; confined to the apex of spines; hymenium 15–20 μm thick, densely arranged in palisade, not present in the apex of spines; basidia 3.5–3.8×15 μm, subclavate to cylindrical, with 4 basidiospores ellipsoid, 1.2–1.8×3–3.2 μm, thin-walled, smooth, non-amyloid.

Habitat: On the dead stems and branches of the broad-leaved trees.

Distribution: Taiwan.

Specimen examined: Taipei Hsien, Wulai Hsiang, Doll Valley, on the road side, under the hardwood forests, alt. 300–400 m, Dec. 25, 1975, S. Lin (NTU-4303, Holotype).

The cystidia of this species also have two kinds of forms. One is cylindrical, thin-walled, scarcely encrusted, confined only to the apex of spines and forming a fimbriate tip of the typical character of spines. The other is fusiform, finely encrusted, thin- to thick-walled, protruding and embedded, forming the main

aspect of the context. In the apical portion of the spines, a few intermediate cystidia the form of which is just between the cylindrical form and the thin-walled, septate, slightly encrusted fusiform are found. Consequently, the cylindrical cystidia are likely to be the initial stage of the fusiform cystidia. The septa found at the fusiform or ventricose cystidia may explain that the two cystidia are identical.

10. ***Hyphodontia lageniformis* sp. nov.** Fig. 14

Basidiocarpi resupinati, late effusi, adnati, 300–500 μm crassi spines includentes, 4×7–10 cm, pelliculosi, mollis, eburneo-bubalini, 5% KOH non reagentes; margines tenues, arachnoidei vel byssoidei, eburnei; aculei columniformes, superficie hymenii sub anglo 60° abeuntibus, ampliores apice, 150–170 μm lati, 200–400 μm longi, angustatiores base, 120 μm lati, aliquando ampliores base.

Stratum basilare fere nullum; stratum intermedium ca. 80 μm crassum, hyphis laxe intertextis propris; hyphae 2–3 μm latae, leptodermae, glabrae, noduloso-septatae; leptocystidium haud incrustatum, cylindricum, Phloxin. facile tinctum, leptodermum, per superficies hymenii et aculei, 4.5–5×20 μm, semper emergens; cystidium metuloideum, lageniformis, crassitunicatum, incrustatum apice, 2 μm altum base, ad 5 μm latum apice, in hymenio non nisi distributum 10–35 μm altum, noduloso-septatum; hymenium 15 μm crassum; basidium juvenis subclavatum, 4–5× 10–11 μm sterigmatibus 2–4; basidiospora ellipsoidea, 3–4×4–5 μm, glabra, leptoderma, nonamyloidea.

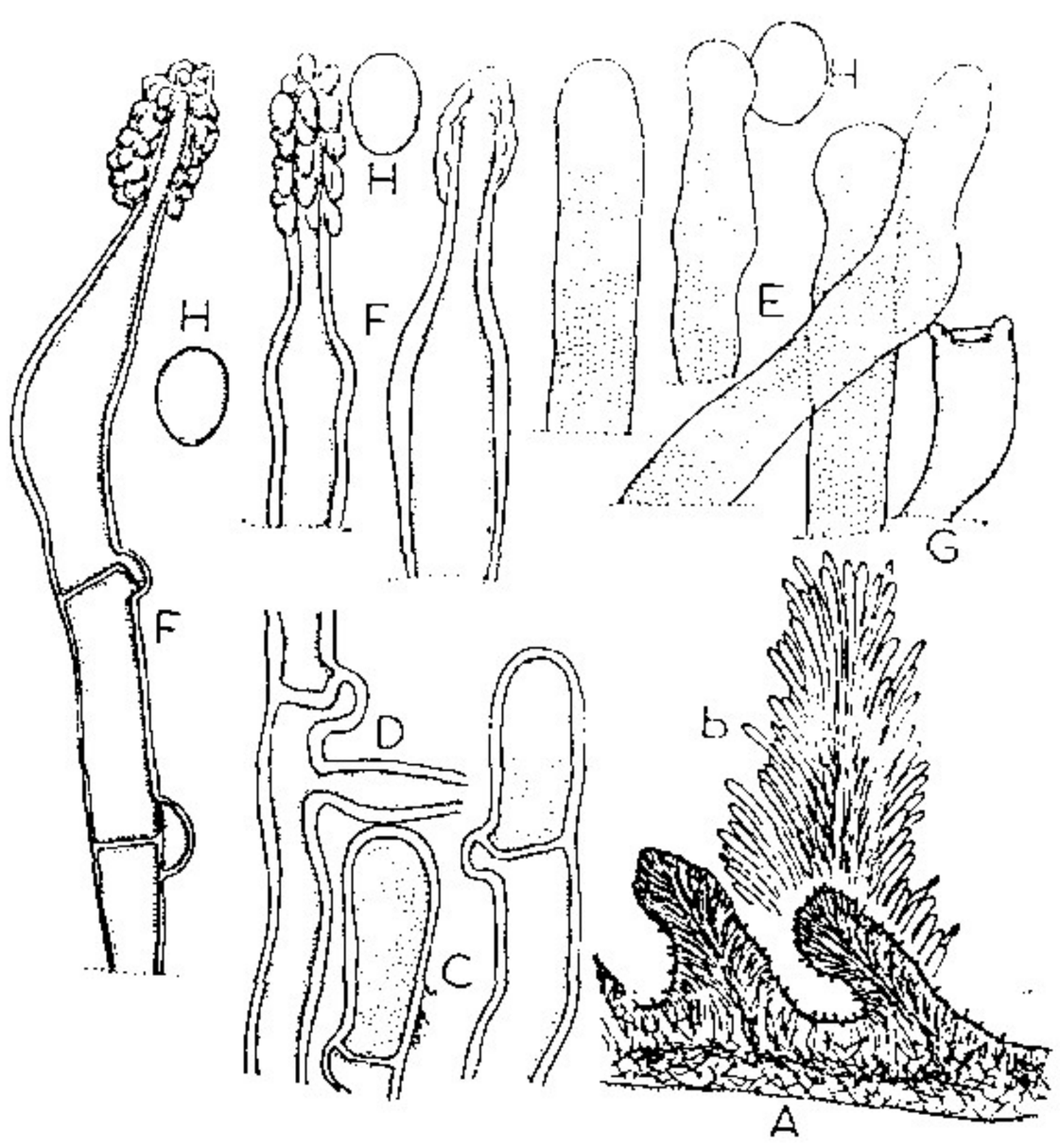

Fig. 14. *Hyphontia lageniformis* sp. nov.

(A): Longitudinal section of basidiocarp showing the continual centers of dense hyphae under the spines, ×73. (B): Spine showing the sterile hyphae more or less in fimbriate manner, ×154. (C): Paraphyses with clamp connections, ×1584. (D) Hypha, ×1584. (E) Cystidioles, ×1584. (F): Encrusted cystidia with clamp connections at lower parts, ×1584. (G): Young basidium, ×1584. (H): Basidiospores, ×1584. All figs. based on Holotype, No. 3913.

Holotypus: TAIWAN: Taipei Hsien, Pinling Hsiang, Dec. 7, 1975, S. Lin (NTU-3913).

Macroscopic characters: Basidiocarps resupinate, widely effused, adnate, 300-500 μm thick including spines, 4×7-10 cm, pelliculose, soft, cream buff or colonial buff, not changing color in 5% KOH; margins thining out, arachnoid or byssoid, ivory yellow; spines column-like, slant in 60 degree, broader at apex, 150-170 μm wide, 200-400 μm long, narrower at base, 120 μm wide, sometimes broader at base.

Microscopic characters: Basal layer almost none; the intermediate layer about 80 μm thick, of loosely interwovened distinct hyphae; hyphae 2-3 μm wide, thin-walled, smooth, with numerous clamp connections; cystidia with two types, presented on the hymenial layer, not immersed in context; cystidioles (leptocystidia) not encrusted, cylindrical, straight or slightly flexuous, rounded at apex, easily stained by phloxine, thin-walled, tufted on the tips of spines and scattered on the hymenial surface, 4.5-5×20 μm, always protruding; metuloid cystidia cylindrical, 3-5 μm wide, with clamp connections, abruptly narrow towards upper parts, 2 μm wide or 3-4 μm wide with the fused rough crystals covered on the tenuate portions, protruding 10-35 μm high, only distributed on the hymenial layer, not present on the tips of spines; hymenium 15 μm thick; young basidia subclavate, 4-5×10-11 μm, protruding, with 2-4 sterigmata; basidiospores ellipsoid, 3-4×4.5 μm, smooth, thin-walled, non-amyloid.

Habitat: On the dead rough branches of the broad-leaved trees.

Distribution: Taiwan.

Specimen examined: Taipei Hsien, Pinlin Hsiang, from Orchid Valley to Mt. Suchuanglo, on the road side, under the hardwood forests, alt. 400-500 m, Dec. 7, 1975, S. Lin (NTU-3913, Holotype).

This new species is characterized by two completely different types of cystidia in origin. One is cylindrical, flexuous leptocystidia (cystidioles) which are easily stained by phloxine; the other is septate, bottle-shaped metuloid cystidia.

11. *Hyphodontia mucronata* (Furukawa) comb. nov. Fig. 15

Basionym: *Odontia mucronata* Furukawa, Bull. Gov. For. Exp. Sta. **261**: 42, f. 34-35, 1974.

Macroscopic characters: Basidiocarps resupinate, widely effused, easily separable, 3×22 cm, 1-1.5 mm thick, ceraceous, strongly cracked, having large crevices and forming separable irregular shape of islands, white to ochraceous buff, not changing color in 5% KOH; margins thining out, tomentose, concolorous, white or light buff; spines subulate or cylindrical, often adhering into small groups and forming coralloid shape with crests divided at the apical portion, crowded, 72-96 μm wide at base, 144-172 μm high, with crystals covered and embedded. Basal layer almost none; intermediate layer 240-528 μm thick, of longitudinally interwovened gelatinized hyphae, hyaline or opaque, with a central core under each spine; hyphae 2.5-3 μm wide, hyaline, thin-willed, smooth, with clamp connections; cystidia obclavate, mucronate at tips, enlarged at bases, numerous, embedded or protruding, with the contents stained by phloxine, thin-walled, 7.5-10×75 μm; spines embedded masses of crystals, with encrusted, clamped, cylindrical, sterile hyphae at the tips, the sterile hyphae 4-4.5 μm wide; hymenium composed of basidia, parphyses and cystidia, arranged in palisade; basidia clavate, 7 μm with 4 basidiospores; sterigmata 3 μm long; paraphyses cylindrical or clavate, 7 μm

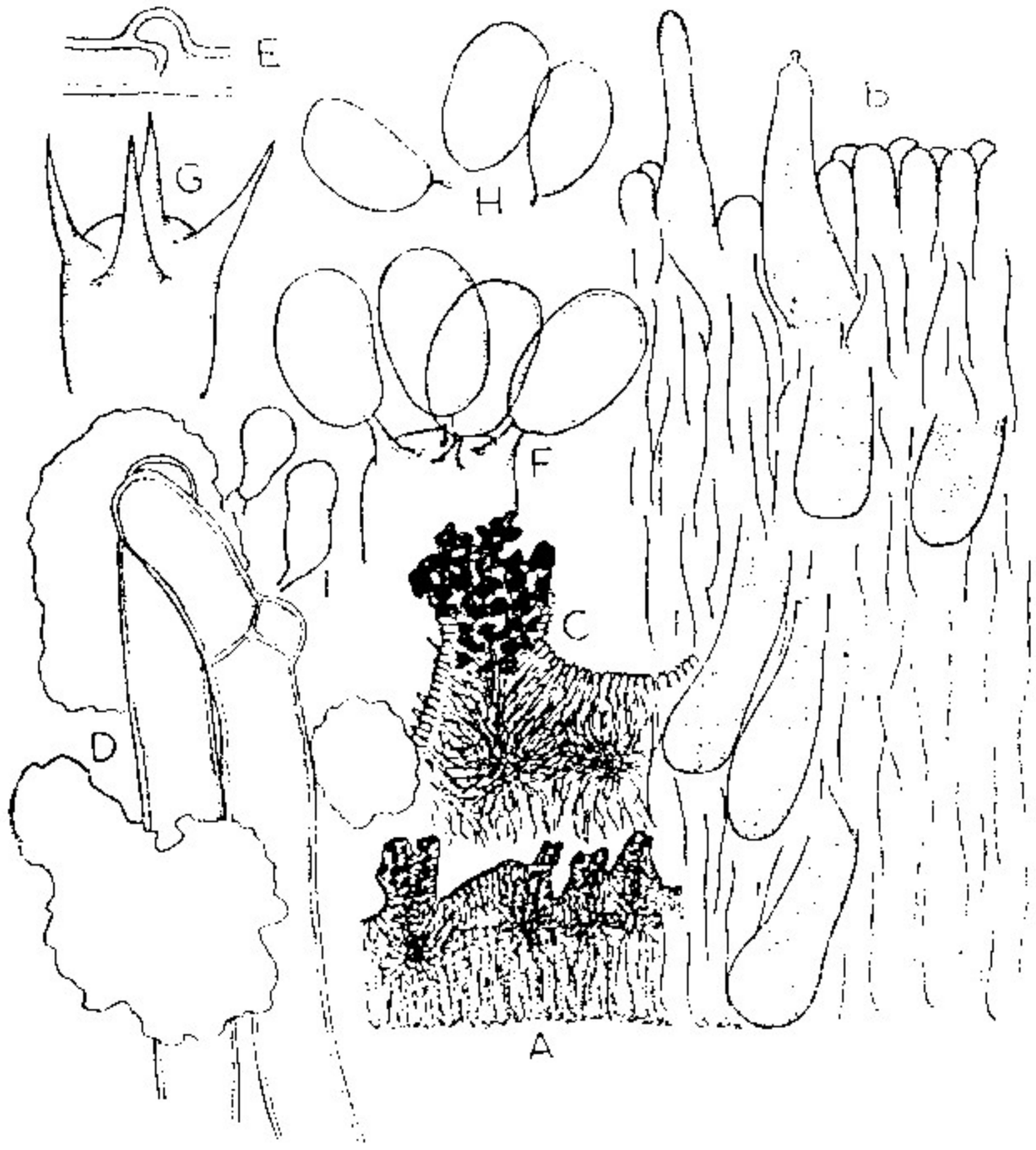

Fig. 15. *Hyphodontia mucronata* (Furukawa) comb. nov.
(A): Longitudinal section of basidiocarp, ×65. (B): Upper part of basidiocarp showing hymenial layer and upper context, ×616. (C): Longitudinal section of spine, showing crystal-embedded spine and the central cores under spines, ×616. (D): Encrusted sterile hyphae at the tip of spine, ×1584. (E): Generative hyphae, ×1584. (F)-(H): Basidiospores and basidia, ×1584. (I): Paraphyses, ×616. All figs. based on No. 3397.

wide; basidiospores ellipsoid, somewhat flatten at one side, 4-5×7-9 μm, apiculate, smooth, thin-walled, non-amyloid.

Habitat: On dead stems of broad-leaved trees, associated with white rot.

Distribution: Japan and Taiwan.

Specimen examined: Taipei Hsien, Chungho Hsiang, Yuentong Temple (圓通寺), on the road side, under the hardwood forests, alt. 100-200 m, Nov. 27, 1975, S. Lin (NTU-3397).

The species established by Furukawa (1974) is characterized by the strongly cracked basidiocarps and the mucronate apex of cystidium. However, the apex of cystidium in our material is not often so mucronate. And the cystidia are mostly immersed in the contex rarely protruding. Additionally, the central cores in the middle parts of the context under each spine, which may be the primary centers of development of spines, are very conspicuous.

12. ***Hyphodontia pilaecystidiata*** **(Lund.) J. Erikss.** Fig. 16

Symb. bot. Ups. **16**: 1, p. 104, 1958; —*Odontia pilaecystidiata* Lund. in Lund. & Nannf., Fung. exs. suec. n. 2146, fasc. 43-44, p. 24-25, 1953.

Macroscopic characters: Basidiocarps resupinate, widely effused, 1-1.5×18 cm, 400 μm thick, thin, soft, ceraceous or subceraceous, not cracked, white to light

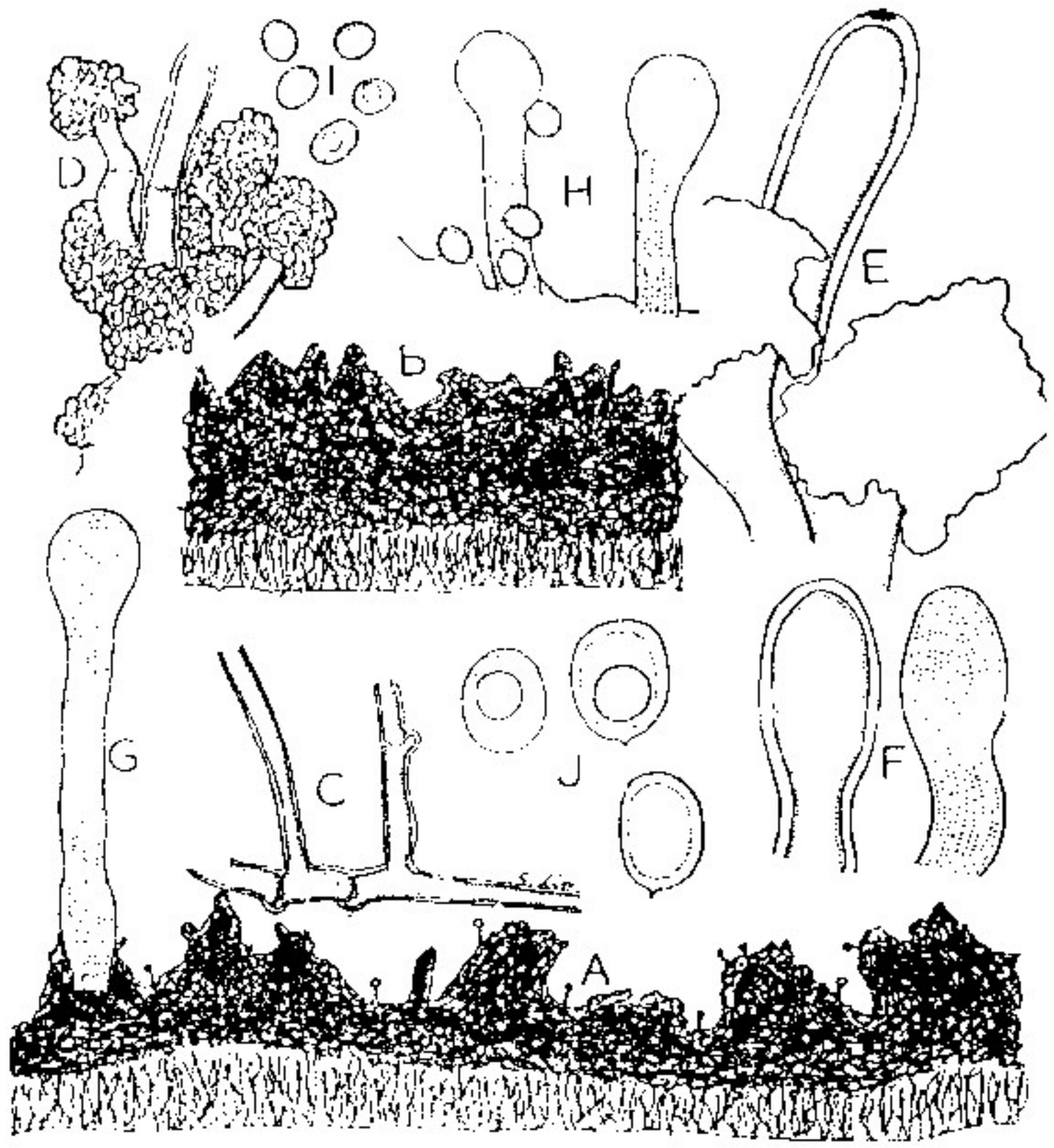

Fig. 16. *Hyphontia pilaecystidiata* (Lund.) J. Erikss.

(A)-(B): Longitudinal section of basidiocarp, ×65. (C): Hyphae at base, ×616. (D): Apical part of spine showing encrusted cystidia, ×616. (E)-(F): Encrusted cystidia and crystal-dissolved cystidia, ×1584. (G): Capitate cystidia, ×616. (H): Capitate cystidia and basidiospores, ×616. (I): Basidiospores, ×616. (J): Basidiospores, ×1584. All figs. based on No. 3150.

buff, not changing color in 5% KOH; margins thining out, floccose, concolorous; spines variable in shapes, mostly conical or aggregated in groups, 10-11 per cm, about 0.1 mm high or more.

Microscopic characters: Basal layer of context almost absent; intermediate layer of context 75-200 μm thick, with longitudinally loosely interwovened hyphae arising laterally from the basal parallel hyphae at right angle; upper half of context including hymenial layer conglutinate in dark color, seemingly provided with crystals embedded among the agglutinized hyphae, about 125-200 μm thick; hyphae thin-walled, with clamp connections, smooth, 3-4.5 μm wide, distinctive at the basal part of context; cystidia only present in the hymenial layer and the region of spine, not immersed, having two types; the one capitate, with contents easily turning red coror in phloxine, thin-walled, smooth, 10 μm in diam., 5 μm wide at the base, scattered in the hymenial layer; the other restricted on spines, roughly encrusted at the upper part, 8.7-10 μm wide including crystals, 6 μm wide if not including crystals, protruding 12.5 μm high, 3.7 μm wide, flexuous, sometimes septate, with the crystals dissolved in 5% KOH; hymenial layer conglutinate; basidia not seen; basidiospores ellipsoid, 3-4×4-6.5 μm, smooth, with one distinct guttula, apiculate, non-amyloid.

Habitat: On the dead culms of *Miscanthus floridulus* (Labill.) Warb., associated with a white rot.

Distribution: Taiwan.

Specimen examined: Taipei Hsien Wulai Hsiang, Doll Valley, on the road side, on the dead culms of *Miscanthus floridulus* (Labill.) Warb., under the broadleaved forests, alt. 300-400 m, Dec. 25, 1975, S. Lin (NTU-3150).

This species is closely related to *Hyphodontia breviseta* (Karst.) Erikss. but can distinguished from the latter by lacking moniliform cystidia and having rather bigger basidiospores.

13. ***Hyphodontia rimosissima* (Peck) Gilb.** Fig. 17

Odontia rimosissima Peck, N. Y. State Mus. Rep., 50: 114, 1897.

Macroscopic characters: Basidiocarps resupinate, effused, adnate, 70-120 μm thick, pelliculose, even, odontoid, not cracked, marguerite yellow; margins thining out, concolorous; spines cylindrical, 300 μm wide at base, 400-700 μm high, with fimbriate sterile encrusted hyphoid cystidia at tips.

Microscopic characters: Basal layer almost non; intermediate layer 50-70 μm thick, of loosely longitudinally interwovened hyphae; 2-2.5-(3) μm wide, thin-walled, smooth or encrusted, with clamp connections; cystidia cylindrical, loosely encrusted, proturing, 3 μm wide, distributed in the tips of spines and hymenium; paraphyses subclavate and constricted, staining dark red in phloxine, 4 μm wide, thin-walled, numerous at hymenium; spines cylindrical, with densely conglutinized hyphae in trama, apex truncate and with fimbriate sterile hyphae (cystidia); hymenial layer 50 μm thick, turning deep blue in aniline blue; but hymenium not sharply differentiated from the loosely arranged subhymenium and context, ascending toward the truncate apex of spines; basidia clavate, 3.5-4×14 μm, with 4 basidiospores; sterigmata 3-4 μm long, 0.5 μm wide at base, curved; basidiospores broadly ellipsoid or subglobose, 3.2-3.5×4-4.5 μm, thin-walled, smooth, one guttulate, non-amyloid.

Habitat: On the dead trunk of *Tsuga chinensis* Pritzel var. *formosana* (Hay.) Li et Keng.

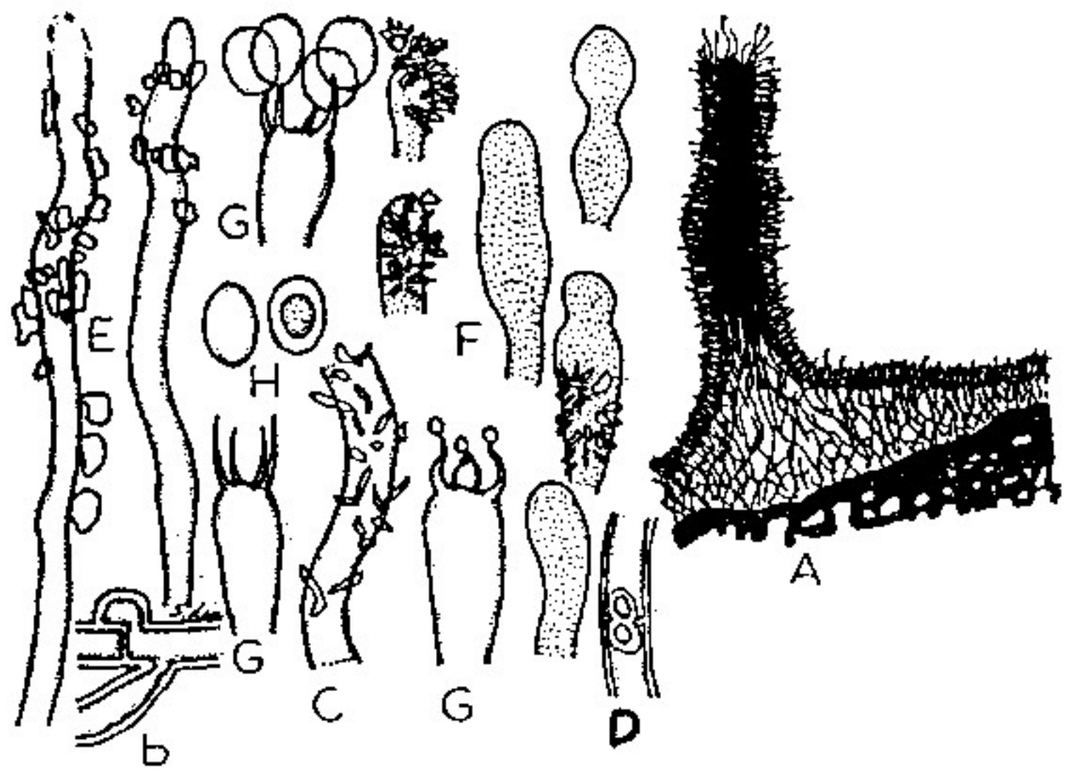

Fig. 17. *Hyphontia rimosissima* (Peck) Gilb.

(A): Longitudinal section of basidiocarp showing the context with loosely arranged interwovened hyphae and the trama of spine with crowdly intertwined hyphae, and also showing fimbriate sterile hyphae at the tip of spine, ×45. (B)-(D): Hyphae smooth or encrusted and with clamp connections, ×1118. (E): Cystidia encrusted ×1118. (F): Paraphyses, ×1118. (G): Basidia bearing basidiospores, ×1118. (H): Basidiospores, ×1118. All figs. based on No. 2355.

Distribution: North America, Japan and Taiwan.

Specimen examined: Kaohsiung Hsien, the Southern Cross Highway, Tutsang-104 K, under the Taiwan Hemlock forests, alt. 2600 m, Jan. 25, 1975, S. Lin (NTU-2355).

Judging from the description and figures of *Odontia rimosissima* Peck. (Furukawa, 1974), we treat our material under this taxon. However, there are some characters which do not coincide with the description of Furukawa, for instance, the texture of the fruit bodies from Taiwan is floccose or pelliculose, while that from Japan is membranaceous. Our material is also similar to *Hyphodontia breviseta* in some respects.

14. *Peniophora aurantica* (Bres.) Hoehn. et Litsch. Figs. 18, 19

Sitzb. Akad. Wiss. Wien Math.-Nat. Kl. I: 115, p. 1583, 1960; —*Corticium auranticum* Bres., Fungi Trid. 2: 37, 1892; —*Gloeopeniophora aurantica* (Bres.) Hoehn. & Litsch., Sitzb. Akad. Wiss. Wien Math.-Nat. Kl. I: 117, p. 1094, 1908; —*Peniophora lepida* Bres., Mycologia 17: 70, 1925.

Macroscopic characters: Basidiocarps resupinate, widely effused, adnate, 2-4.5 ×5-12 cm, 100-260 μm thick, membranaceous, even or minutely granular, not cracked, white, pale pinkish buff to margerite yellow or cream color, not changing color in 5% KOH; margins thinning out, pruinose, concolorous; spines if present, conical, narrowly fimbriate at slender apex, in which a single or several cystidia are

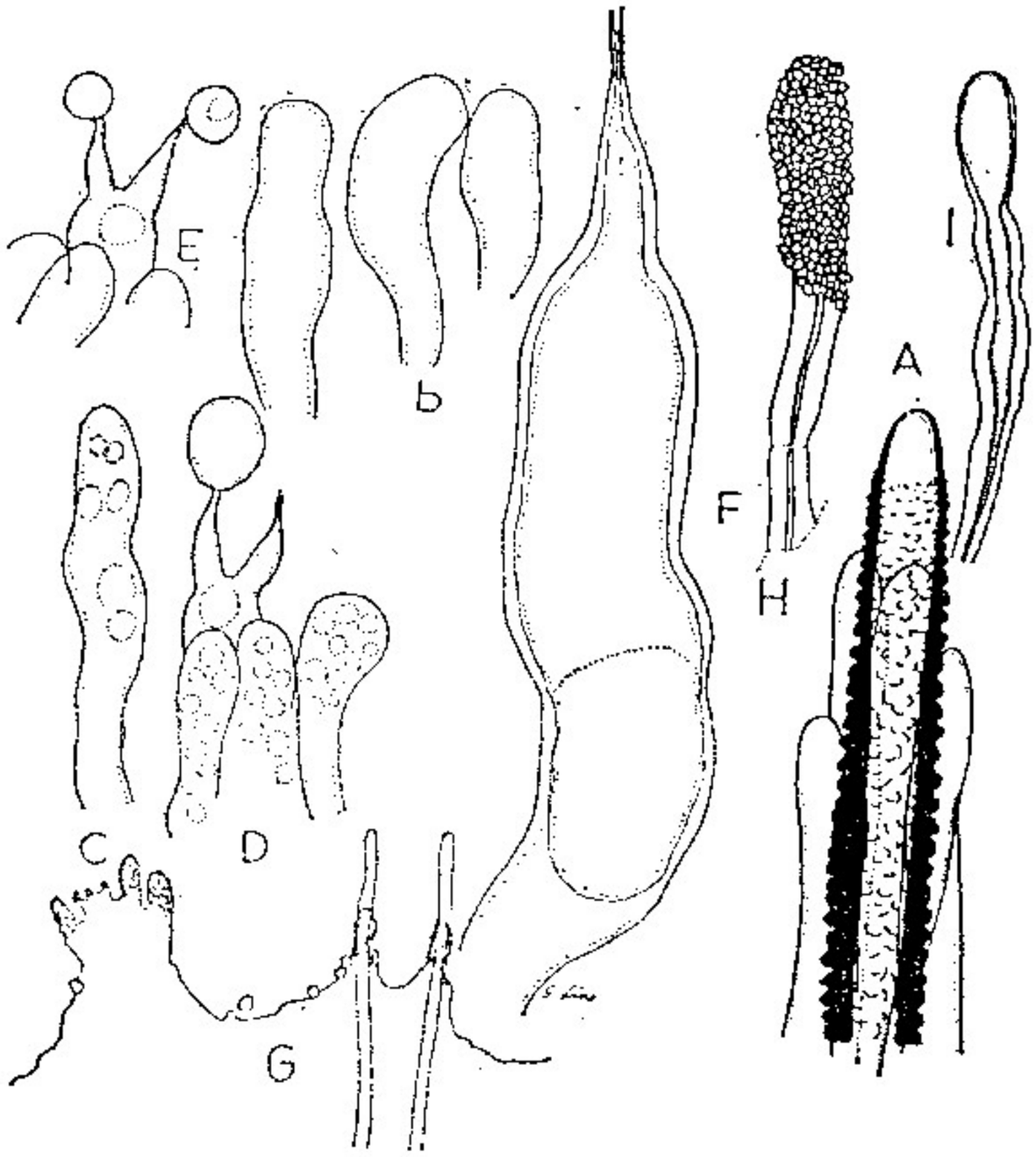

Fig. 18. *Peniophora aurantica* (Bres.) Hoehn. et Litsch.

(A): Finely encrusted cystidium and enmeshed hyphal sheath, ×616. (B): Gloeocystidia embedded in the context, ×616. (C): Paraphyses, ×616. (D)-(E): Basidia, paraphyses and basidiospores, ×616. (F): Basidium in lateral view, ×1584. (G): Longitudinal section of basidiocarp showing the configuration of hymenial surface and the cystidia, ×112. (H): Encrusted cystidia, ×444. (I): Crystal-dissolved cystidia, ×444. Figs. A-F based on No. 4302; G-I on No. 2925.

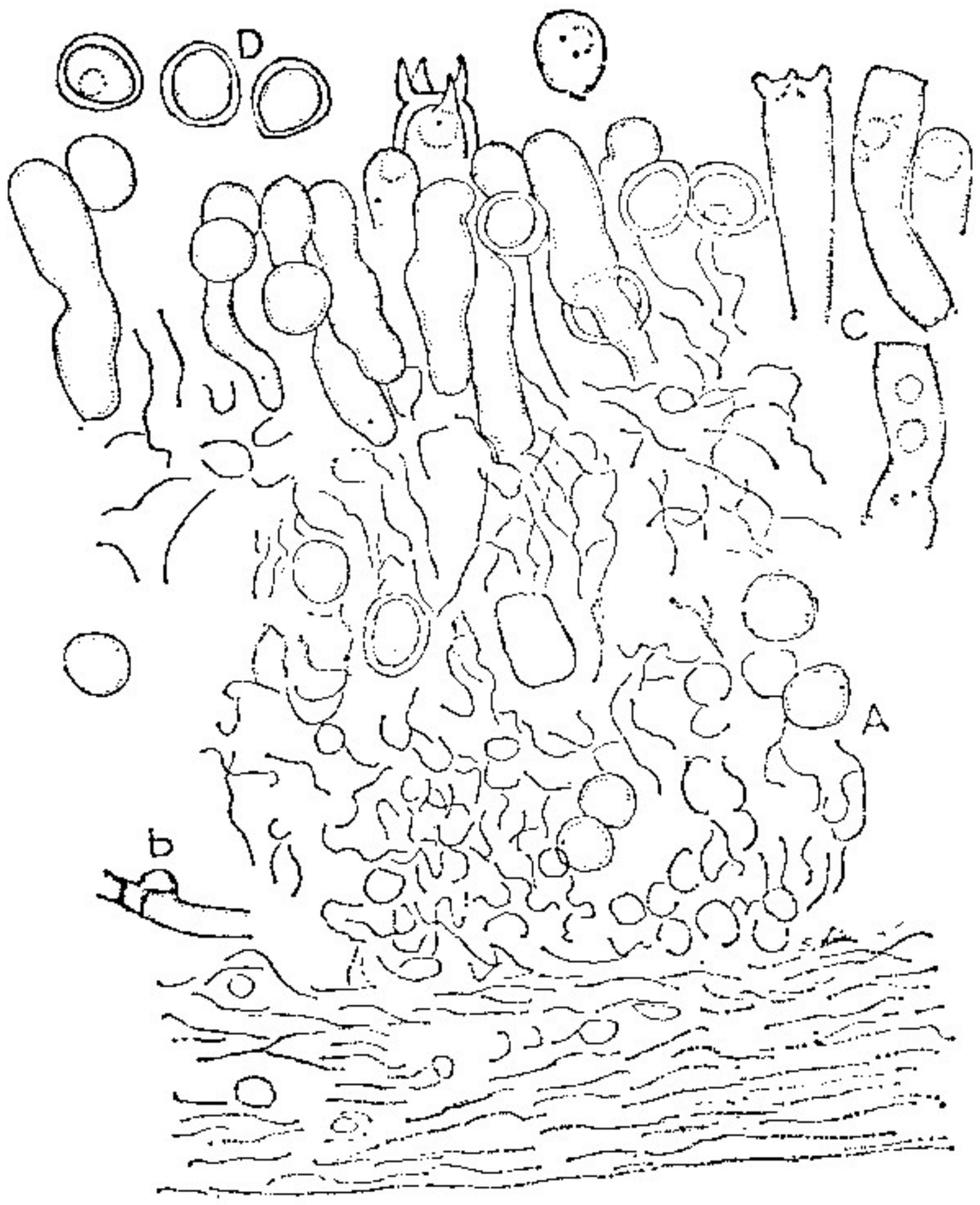

Fig. 19. *Peniophora aurantica* (Bres.) Hoehn. et Litsch.

(A): Longitudinal section of basidiocarp, ×616. (B): Hypha in the intermediate context, ×616. (C): Young basidia, ×616. (D): Basidiospores, ×616. All figs. based on No. 4302.

occupied (see fig. 18A), 70 μm wide, 130 μm high.

Microscopic characters: Basal layer of context 25-37 μm thick, separable from substrata, composed of densely parallel thick-walled hyphae; intermediate layer of context 30-180 μm thick, of vertically densely interwovened hyphae; often in 2 to 3 layers; hyphae at basal layer with wall 1.5-2 μm thick, 5 μm wide, with clamp connections, hyphae at intermediate layer thin-walled, smooth, with abundant clamp connections, frequently irregularly turgid, 3.5-10 μm wide; cystidia rare, cylindrical, finely encrusted, aseptate, with wall 2-3 μm thick, thinner towards apex, sometimes enmeshed in the sterile hyphal sheath, protruding, smooth at apex, protruding 40-100 μm high, 7-9 μm wide, while the hyphae of the sheath smooth, thin-walled, cylindrical, flexuous, containing oil drops, easily stained by phloxine, rounded or obtuse at apex, 10-12×23-37 μm, densely and compactly embedded among context; basidia clavate or ventricose, 10×18-38 μm, with 2-(4) basidiospores; sterigmata curved, 10 μm long, 3 μm wide at base; paraphyses capitate, more or less moniliform, nodding; basidiospores subglobose, globose, elliptical to obovate, thin-walled to thick-walled, with walls to 2 μm thick, 11-12.5×8.7-12.5 μm, frequently embedded, smooth, l-guttulate, non-amyloid.

This species is characterized by its having dumbell-shaped basidia, large sterigmata, the gloeocystidia which are very similar to paraphyses and the thick-walled hyphae presented in subiculum.

Habitat: On dead stem of the broad-leaved trees.

Distribution: Europe, North America, Kamchatka Peninsula, Japan and Taiwan.

Specimen examined: Taipei Hsien, Wulai Hsiang, Doll Valley, on the road side, under the hardwood forests, alt. 300-400 m, Dec. 25, 1975, S. Lin (NTU-4302); Taipei Hsien, Pinlin Hsiang, Orchid Valley to Mt. Suchuanglo, on the road side, under the hardwood forests, alt. 400-500 m, July 24, 1975, S. Lin (NTU-2925).

15. ***Peniophora cinerea* (Fr.) Cooke** Fig. 20

Grevillea 8: 20, 1879; —*Thelephora cinerea* Fr., Syst. Myc. 1: 453, 1821; —*Corticium cinereum* (Fr.) Fr., Epicr. Muc. p. 563, 1836-1838.

Macroscopic characters: Basidiocarps resupinate, widely effused, forming longitudinal areas, adnate, very thin, 38-87 μm thick, 1-2×9-13 cm, ceraceous, even, rigid in appearance, more or less pruinose, narrowly crossly cracked, tilleul-buff or seashell pink, turning wood brown to clove brown or black in 5 or 15% KOH; margins thining out, pruinose, concolorous, or abruptly cutting off and becoming distinctly demarcated as in the little branches collections.

Microscopic characters: Basal layer of context almost none; intermediate

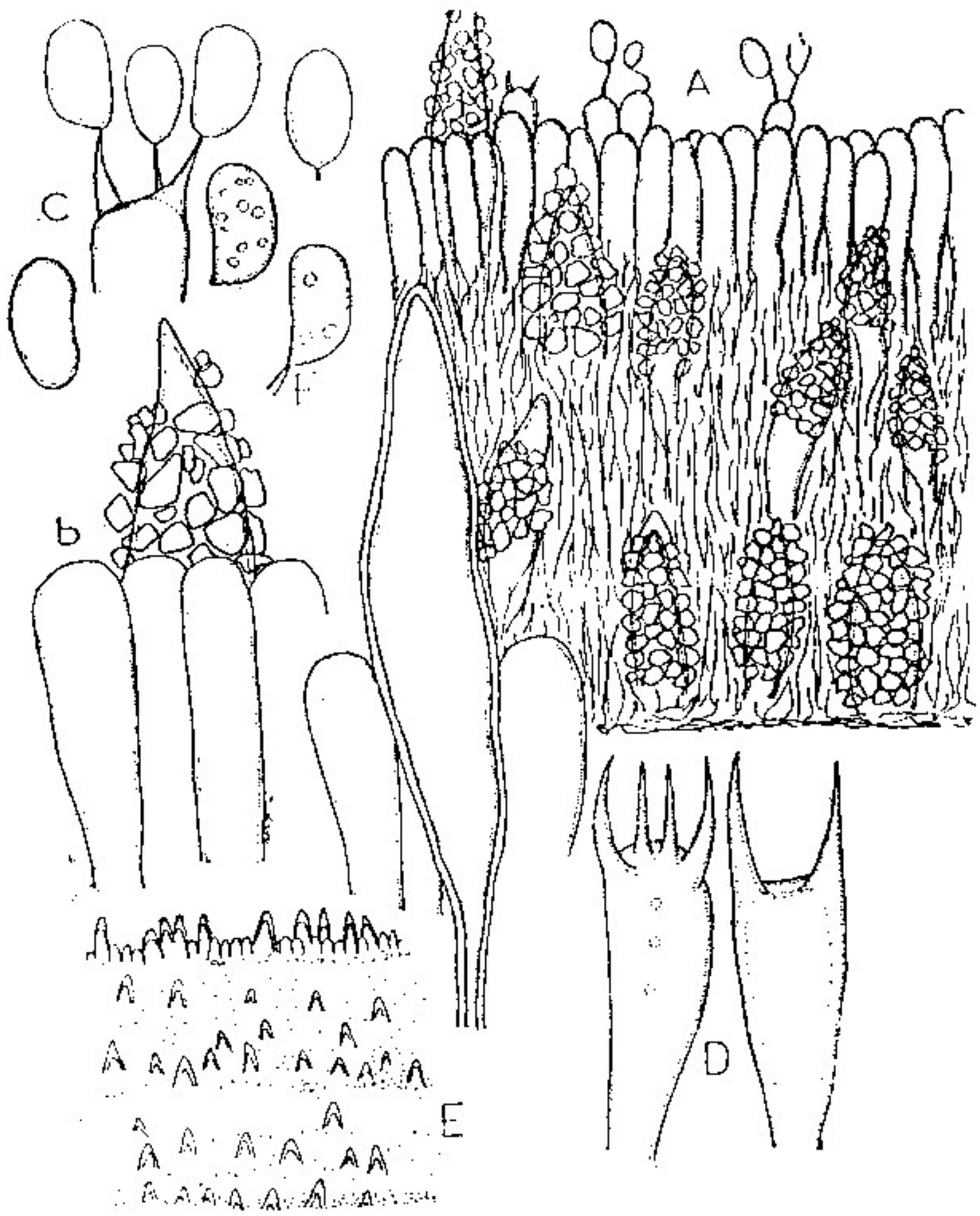

Fig. 20. *Peniophora cinerea* (Fr.) Cooke

(A): Longitudinal section of basidiocarp showing the encrusted cystidia embedded in the densely longitudinally interwovened hyphae and protruding from hymenium, ×616. (B): A part of hymenium showing paraphyses and cystidia, ×1584. (C): Basidium and basidiospores, ×1584. (D): Basidia, ×1584. (E): Longitudinal section of basidiocarp showing the cystidia scattered in the context and protruding from hymenium, ×154. (F): Basidiospore, ×1584. Figs. A-D based on No. 3396; E-F on No. 3303.

layer of context composed of longitudinally interwovened gelatinized hyphae; thickening of the basidiocarps by repititive context; hyphae 2.8–4 μm wide, thin-walled, smooth, septate, without clamp connections, extremely compact, even gelatinized, obscure; cystidia numerous, irregularly immersed or slightly projecting up to 17.5 μm high, fusiform, acute to acuminate at apex, thin- to thick-walled, not encrusted or encrusted with rough crystals, aseptate, without clamp connections, with walls not dissolved in 5% KOH, about 30 μm long, 6 μm wide (not including crystals), up to 10 μm wide including crystals, not radicate, with narrow pedicels, 5 μm wide; gloeocystidia absent; hymenial layer 25-40 μm thick, arranged in compact palisade; paraphyses cylindrical, flexuous, rounded at apex, 3-4×35 μm; basidia short clavate to subclavate, 4-5.2×15-20 μm, with 2-4 basidiospores; sterigmata curved, 1 μm wide at base, 3-5 μm long; basidiospores oblong or oblong-ellipsoid, suballantoid, slightly curved on one side, depressed on other side, attenuate and acute towards base, (5)-7-(8)×(2.8)-3-(4.2) μm, strongly apiculate, smooth, thin-walled, with several droplets, non-amyloid.

Habitat: On the dead branches of broad-leaved trees.

Distribution: Europe, North and South America, South Africa, New Zealand, Kamchatka Peninsula, China, Japan and Taiwan.

Specimen examined: Taipei Hsien, Chungho Hsiang, Yuentong Temple, on the road side, under the broad-leaved forests, alt. 300 m, Nov. 25, 1975, S. Lin (NTU-3903, 3396).

This species is characterized by (1): fruit bodies turning wood brown or clove brown to black in 5% KOH or 15% KOH, (2): basidiospores 3×7-8 μm, oblong and slightly curved, (3): hymenial surface finely crossly cracked, even, tilleul-buff or seashell pink (4): cystidia thin—to thick-wall, smooth or encrusted with coarse crystals, and (5): hyphae generally 3-3.5 μm wide, without clamp connections, septate. It is very closely related to *Peniophora quercina* (Pers.: Fr.) Cke., but the latter has larger basidiospores and basidia, thicker fructifications, and the hyphae with clamp connections (Hayashi, 1974). On the whole, we are almost unable to distinguish it from *Peniophora ravenelii* Cke., because they are similar in the characters of hyphae, cystidia, texture and hymenial surface, except in the color of the basidiocarps and in their color change to KOH solution.

16. ***Peniophora incarnata* (Pers.: Fr.) Karst.** Fig. 21

Hedwigia **28**: 27, 1889; —*Thelephora incarnata* Pers., Syn. Mith. Fung. p. 573, 1801; —*Thelephora incarnata* Pers. ex Fr., Syst. Mycol. **1**: 444, 1821; —*Corticium incarnatum* (Pers. ex Fr.) Fr., Epicr. Myc. p. 564, 1836-1838; —*Gloeopeniophora incarnata* (Pers. ex Fr.) Hoehn. & Litsch., K. Akad. Wiss. Wien, Math.-Nat. Kl. Sitz. **116**: 816, 1907; —*Gloeocystidium incarnatum* (Pers.) S. Ito, Myc. Fl. Japan **2**(4): 119, 1955.

Macroscopic characters: Basidiocarps resupinate, effused forming orbicular area, 1.8×3.5 cm, very thin, 50-65 μm thick, adnate, ceraceous, even, not cracked, with extremely fine particles, looked like opaque punctate, loosely scattered, white gray, not changing color in 5% KOH; margins thining out, white or concolorous.

Microscopic characters: Basal layer of context very thin, partially penetrating through the wall of cork cells of substrata, 10 μm thick; intermediate layer of context indistinct, masked by crowded erect gloeocystidia and metuloid cystidia, about 50 μm thick, of longitudinally interwovened hyphae; hyphae 1.5-1.8-2-3 μm wide, with clamp connections, thin-walled, smooth, often gelatinized; metuloid cystidia cylindrical, 10-50 μm long, 5-8 μm wide including crystals, with

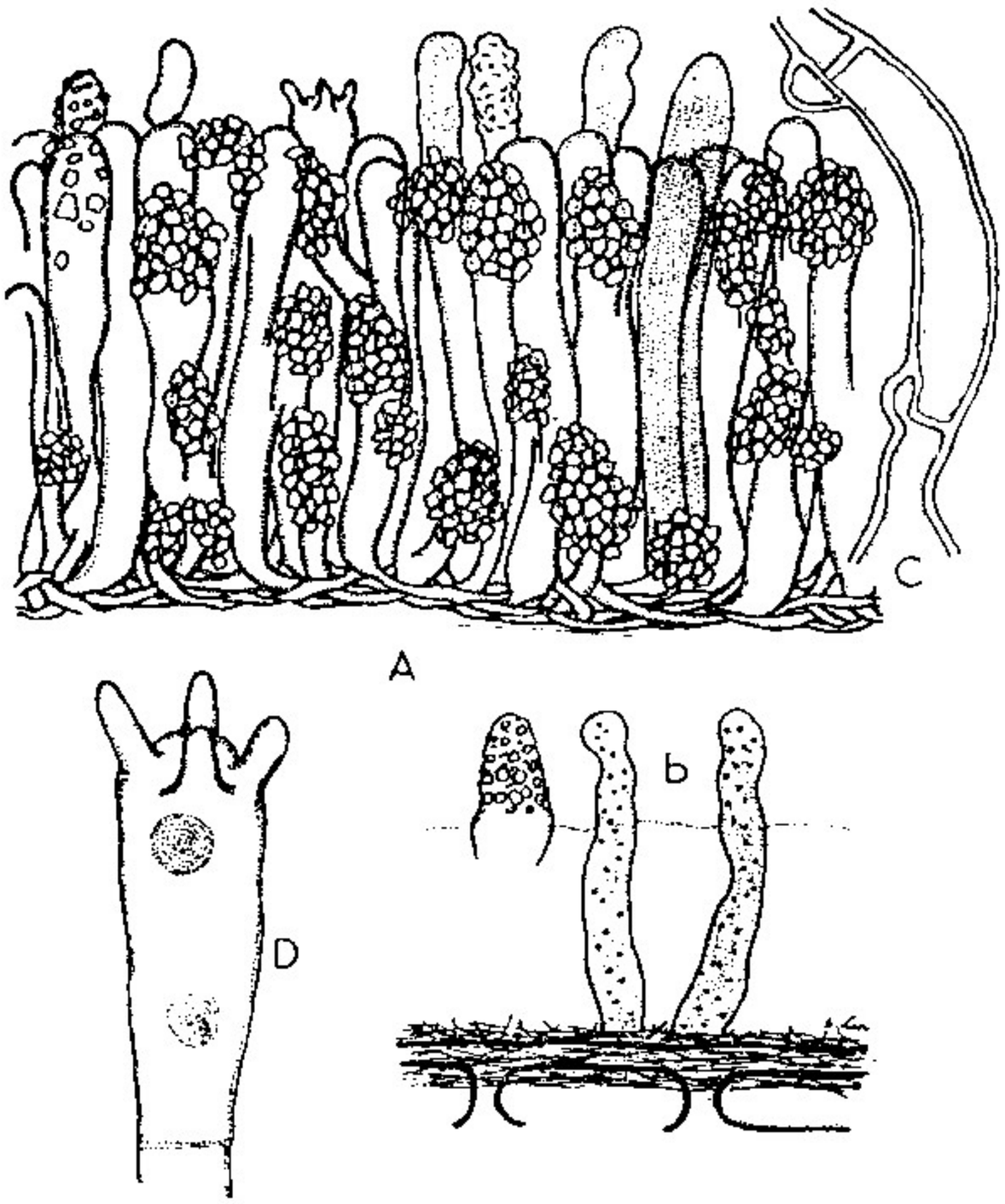

Fig. 21. *Peniophora incarnata* (Pers.: Fr.) Karst.
(A): Longitudinal section of basidiocarp showing the reduced basal context and indistinctive intermediate context which is almost occupied by the numerous erect gloeocystidia and encrusted cystidia, × 616. (B): Longitudinal section of basidiocarp showing the protruding cystidium and gloeocystidia and the basal layer of the context most of which is in the cell wall of the substrata, ×616. (C): Hypha with clamp connections, ×1584. (D): Basidium, ×1584. All figs. based on No. 3649.

rough crystals covered on the slightly swollen conic apex, 4–5 μm wide excluding crystals at apex, embedded or protruding, 15 μm high; gloeocystidia cylindrical, rounded or obtuse at apex, slightly flexuous, 5–6×50–55 μm, 9 μm wide at base, protruding 15–17.5 μm high, easily stained by phloxine, turning brown color in Melzer's reagent, arising from the basal few parallel hyphae, arranged in palisade, occupied the most space of the intermediate layer; hymenium indistinct; basidia subclavate, 7×15 μm, with 4 basidiospores; sterigmata 1.8 μm wide; basidiospores suballantoid, 4.2×11 μm, smooth, thin-walled, non-amyloid.

Habitat: On the dead twigs of the broad-leaved trees, associated with *Hypoxylon* sp. on the barks.

Distribution: Europe, North America, South Africa, Australia, New Zealand, Japan and Taiwan.

Specimen examined: Taitung Hsien, Lanyu Hsiang, Yeiu Tsun, in the ditch of mountain, under the broad-leaved primary forests, alt. 50–300 m, Aug. 22, 1975, S. Lin (NTU-3649).

So far as we can determine, the hymenial layer because it is masked by the numerous cystidia and gloeocystidia becomes obscure and is not so dense a palisade of basidia as generally described. The clamped hyphae are not easy to find unless great care is taken.

17. ***Peniophora spathulata*** **sp. nov.** Fig. 22

Basidiocarpi resupinati, effusi, adnati, membranacei vel ceracei, superificie canities, non rimorsa, aequa, nigrescens in KOH; subiculum fulvum; hyphis conglutinatis; cystidia spathulata, mucronata apice, incrustata, 35–37.5×6–12.5 μm; basidiosporae cylindricae, parum curvatae, parietibus levibus, hyalinae, apiculatae, nonamyloidibus, 2.6–3×6–8 μm.

Holotypus: TAIWAN: Taipei Hsien, Mt. Seven-star, S. Lin (NTU–4304).

Macroscopic characters: Basidiocarps resupinate, widely drussed, adnate, very thin, 38–100 μm thick, 3×5 cm, membranaceous, even to undulate, but cracked by substrata, forming reticulate appearance, drab-gray or pallid mouse gray, turning black in 5% KOH; margins thining out, pruinose, white.

Microscopic characters: Basal layer almost none; basal part of the intermediate layer 30–60 μm thick, without clear delimitation to the substrata, yellowish brown, of densely interwovened obscure hyphae; upper part of the intermediate

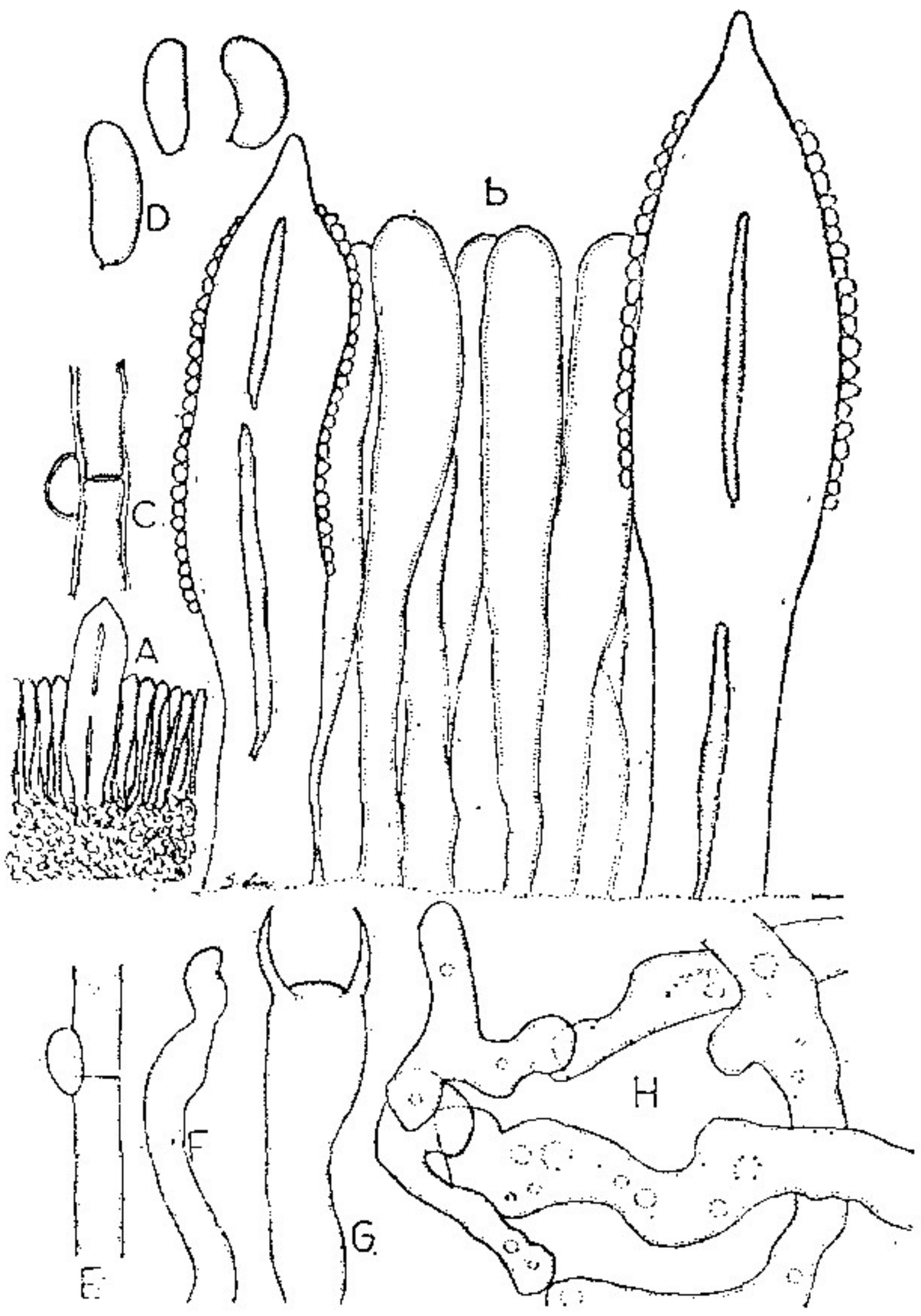

Fig. 22. *Peniophora spathulata* sp. nov.

(A): Longitudinal section of basidiocarp showing the cystidium arising from the basal context and projecting through the hymenium, ×616. (B): Upper intermediate context and hymenium, ×1584. (C): Hypha with clamp connection, ×1584. (D): Basidiospore, ×1584. (E): Hypha, ×1584. (F): Projecting hypha, ×1584. (G): Basidium, ×1584. (H): Hyphae of subiculum, ×1584. All figs. based on Holotype, No. 4304.

layer of context 30-40 μm thick, indistinct, of longitudinally interwovened hyphae, mostly masked by ancillary organs; hyphae of basal part of intermediate layer 3-5 μm wide, gelatinized, brown, thin-walled, smooth, septate, without clamp connections, interwovened and twisted, distinct hyphae found in substrata; hyphae of the upper part of the intermediate layer 2.5-4 μm wide, thin-walled, smooth, slender, septate, rarely with clamp connections, vertically arranged; cystidia spathulate, mucronate at apex, rather thick-walled, opaque, with narrow lumen, 3-6 μm wide at base, 6-12.5 μm wide at upper portions (including crystals), 35-37.5 μm long, finely encrusted at upper portions, with the crystals dissolved in KOH; basidiospores narrowly oblong or suballantoid, slightly curved, 3×8 μm, apiculate, thin-walled, smooth, non-amyloid.

Habitat: On the dead branches and stems of the broad-leaved trees.

Distribution: Taiwan.

Specimen examined: Taipei Hsien, Mt. Seven-star, on the road side, under the hardwood forests, alt. 700 m, Dec. 6, 1975, S. Lin (NTU-4304, Holotype).

The spathulate cystidium with mucronate apex and narrow lumen is the diagnostic character of the new species. The fructications are very thin and not cracked, although the substrata are strongly cracked. Additionally, the species is characterized by its color, from pallid mouse gray turning to black by 5% KOH solution, and by its brown subiculum which can not be distinguished from the substrata. It is closely related to *Peniophora quercina* (Pers.: Fr.) Cke. and *P. cinerea* (Fr.) Cke., but this new species can be distinguished from them by its peculiar cystidia, thin fructification and small size of basidiospores.

18. ***Phanerochaete alba* sp. nov.** Fig. 23

Basidiocarpi membranacei, effusi, separabiles, albi, pallidi vel subalutacei, inaequaliter rimosi; margo fortiter reflexus, concolorus, separabilis; contextum 1-4-stratosum, hyphis parallelibus et longitrorsum intertextis in quoque stato; cystidia inclusa vel protrudentia, incrustata, parietibus crassibus, fusiformia; hyphae afibulatae, septatae, parietibus tenuibus, 2-4 μm latae; basidia clavata, 5-6×30 μm, basidiosporis 4; basidiosporae elliptaicae, 3-4×4-5 μm, parietibus levibus, hyalinae, nonamyloidibus.

Holotypus: TAIWAN: Taipei Hsien, Mt. Seven-star, S. Lin (NTU-3407).

Macroscopic characters: Basidiocarps resupinate, widely effused, easily separable from the substrata and forming strongly recurved cracked margins when dry, 125-300 μm thick, 2-3×11-20 cm, membranaceous, even, smooth, irregularly cracked, shining or vernicose, silver white or pallid to light buff, not changing color in KOH; margins thining out, or clear cut, easily separable and reflexed when dry, silver white.

Microscopic characters: Context with the differentiation of basal layer and intermediate layer; the thickening of the basidiocarps by repititive context in 4 strata; basal layer of context up to 50 μm thick, of the parallel compact hyphae, without cystidia; intermediate layer 20-80 μm thick, of longitudinally interwovened hyphae; cystidia fusiform, encrusted, thick-walled, with rough crystals at the upper portions, broader at basal portions, embedded in intermediate layer and protruding at hymenial layer, protruding 15-30 μm high, 5-12.5 μm wide including crystals, 12.5-55 μm long, with crystals dissolved in 5% KOH, but the wall not dissolved, with thick wall up to 1.5-3 μm thick, with the pedicel narrow, 6-7 μm

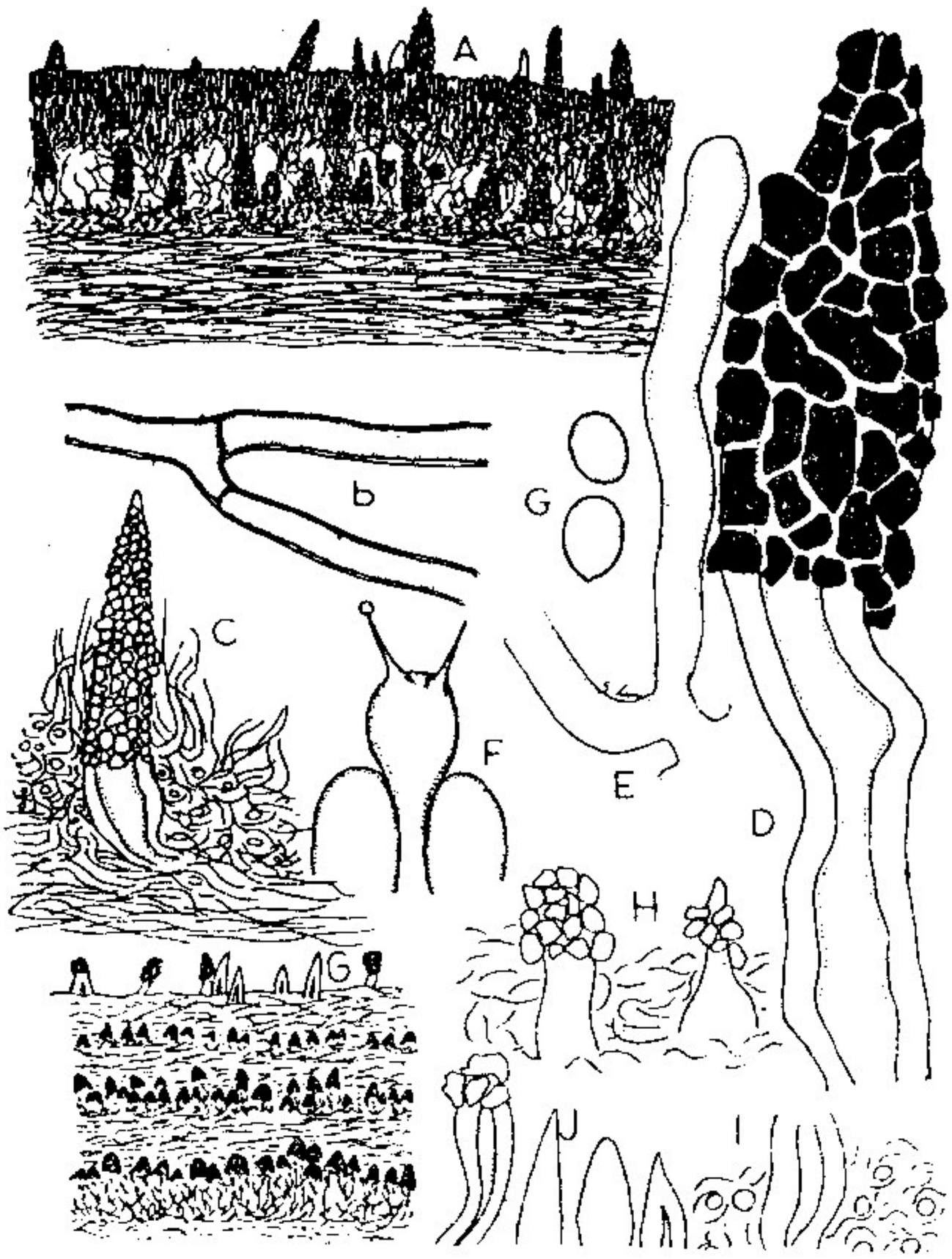

Fig. 23. *Phanerochaete alba* sp. nov.

(A): Longitudinal section of basidiocarp showing the obvious stratification, loose hyphae in the lower part of intermediate layer of context among which cystidia abundantly embedded or sometimes projecting through hymenium, ×154. (B): Hypha, ×1584. (C): Cystidium originating from the uppermost parallel hyphae of the basal context, ×616. (D): Cystidium, ×1584. (E): Hypha in subhymenium, ×1584. (F): Basidium and paraphyses, ×1584. (G): Longitudinal section of basidiocarp with four strata and with distinctive differentiation of basal and intermediate layer of context in each stratum, ×154. (H): Cystidia originating from the basal layer of context and growing upward into the intermediate layer of context, ×616. (I): Lower part of cystidium showing its occurrence, ×616. (J): Protruding cystidia from the upper portions of which the crystals are easily dissolved in 5% KOH solution, ×616. All figs. based on Holotype, No. 3407.

wide, thik-walled in 2–3 μm thickness, not radicate; hymenium 30 μm thick; paraphyses cylindrical, 3–5 μm wide; basidia clavate, 5–6×30 μm, with 2–4 basidiospores; sterigmata straight, 5 μm long; basidiospores ellipsoid, 3–4×4–5 μm, smooth, thin-walled, non-amyloid.

Habitat: On the dead branches of the broad-leaved trees.

Distribution: Taiwan.

Specimens examined: Taipei Hsien, Mt. Seven-star, on the road side, under the hardwood forests, alt. 700 m, Dec. 6, 1975, S. Lin (NTU-3407, Holotype); Taichung

city, campus of Tunghai University, in the yard of the house, on the dead and burned branches of *Delonix regia* (Bojer ex Hook.) Raf., alt. 300 m, Aug. 1, 1975, S. Lin (NTU-2890); Taipei Hsien, Chungho Hsiang, Yuentong Temple, on the road side, under the hardwood forests, alt. 300 m, Nov. 28, 1975, S. Lin (NTU-3902).

So far as the cystidia is concerned, this new species may be confused with *Phanerochaete sordida* (Karst.) Erikss. & Ryv. They do not seem to be distinctly different in shape, size and wall thickness of cystidia, especially when the crystals are restricted to the apex of cystidia. However, the macroscopic characters, e.g. the cystidial distribution, orientation of hyphae in context and the features of hyphae, are apparently different in both species. It is also very similar to *Phanerochaete ravenelii* Cke. in many ways, but the present species can be distinguished from the latter by its cystidia covered with rough crystals, having parallel compact hyphae in basal layer of context and having white color in sections.

19. *Phanerochaete commixtoides* sp. nov. Fig. 24

Basidiocarpi resupinati, effusi, adnati, tenues, membranacei vel cretacei, 50-100 μm crassi, superficie alba, cremea vel eburnea flava, levis vel vadose faveolata, non rimosa; margo tenuis, albus, pruinosus; subiculum conglutinatum, hyphis obscuris vel incrustatis partim; hyphae 2-3 μm latae, parietibus levibus, septatae, non fibulatae; hyphae fertilises erectae, distinctae, basidia et paraphyses in racemis formantae; leptocystidia cylindrica, rotundata vel raro acuta apice protrudenta, 30-50×4-5 μm, parietibus levibus, raro septata base, levia; hymenium densum, 25 μm crassum; basidia brevi-clavata, 20×7-9 μm; basidiosporis 2-4; sterigmata brevia; basidiosporae globosae vel subglobosae, 2.8-7 μm diametero vel 5-6×6-7.5 μm, parietibus levibus vel moderatibus, hyalinae, nonamyloidibus, apiculatae.

Holotypus: TAIWAN: Taitung Hsien, Lanyu Island, S. Lin (NTU-3644).

Macroscopic characters: Basidiocarps resupinate, effused, adnate, 50-100 μm thick, 4-5×5 cm, cretaceous or membranaceous, even or shallowly faveolate, not creviced; white or cartridge-buff, light buff, cream color or ivory yellow, turning reed yellow or primrose yellow in 5% KOH; margins thining out, pruinose, white.

Microscopic characters: Basal layer of context almost none, conglutinized, chalky, embedded with masses of crystals, with collapse and encrusted hyphae; intermediate layer of context loosely arranged by erect distinct fertile hyphae; hyphae 2-3 μm wide, thin-walled, smooth or finely partially encrusted, broader at base 3-5 μm wide, septate, without clamp connections, with cells 4×11-14 μm; hymenial layer 25 μm thick, composed of cymose clusters of basidia and paraphyses originating from the basal fertile erect hyphae; leptocystidia paraphysate hypha-like, simple, thin-walled, cylindrical or attenuate toward upper ends, rounded or rarely acute and constricted near apex, rarely septate at base, protruding 30-50 μm high, 4-5 μm wide, at base, smooth, rare; basidia short clavate, 7-9×20 μm, with 2-4 basidiospores; sterigmata short; basidiospores globose or subglobose, 2.8-7 μm in diam., or 5-6×6-7.5 μm thin to moderate thick-walled, smooth, apiculate, non-amyloid.

Habitat: On the dead stems of the broad-leaved trees.

Distribution: Taiwan.

Specimen examined: Taitung Hsien, Lanyu Hsiang, Yeyiu Tsun, in the mountain valley, under the tropical hardwood forests, partial shade, dry, alt. 50-300 m, Aug. 22, 1975, S. Lin (NTU-3644, Holotype).

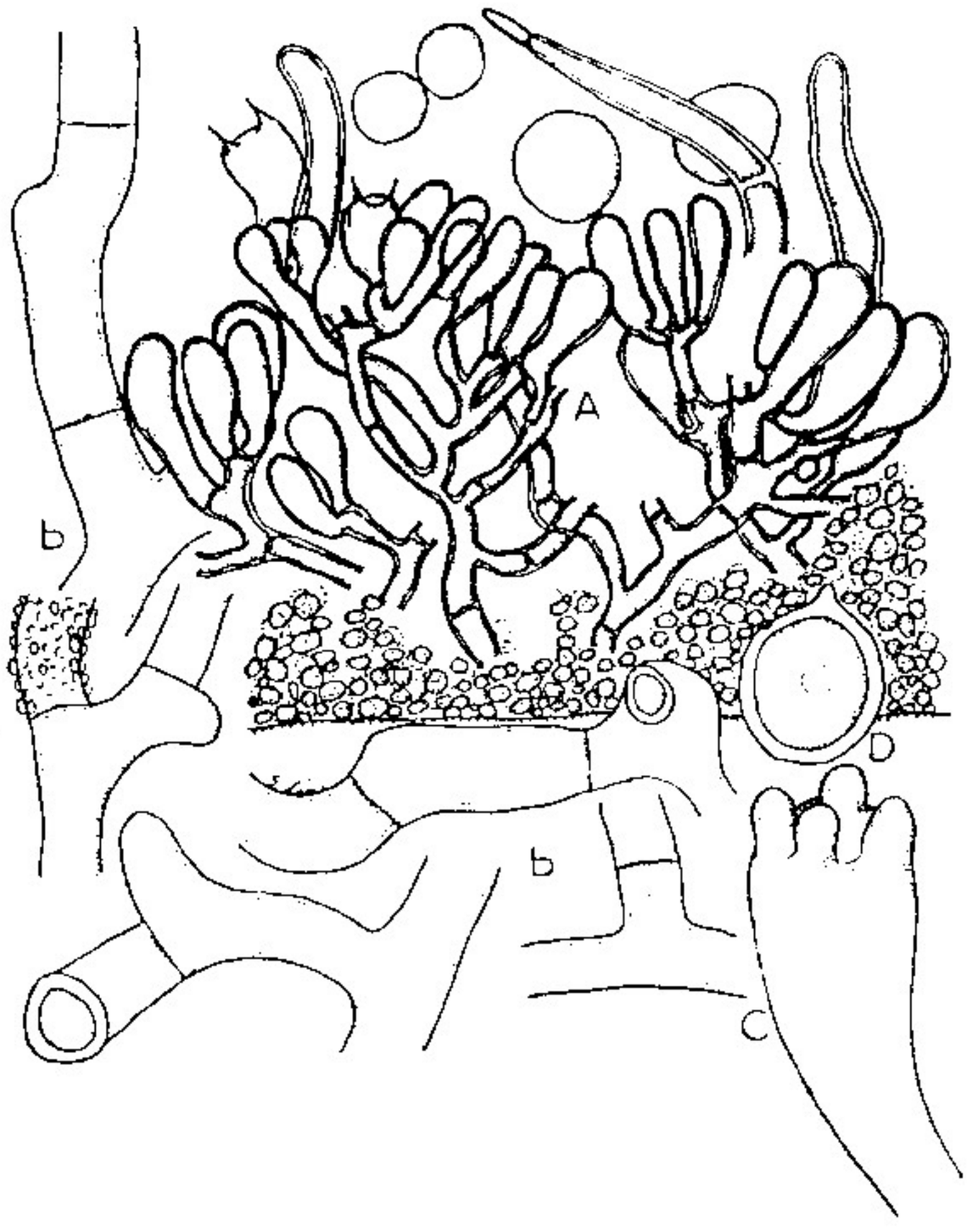

Fig. 24. *Phanerochaete commixtoides* sp. nov.

(A): Longitudinal section of basidiocarp showing the conglutinized basal context, cymose arrangement of basidia and paraphyses arising from the fertile erect hyphae, leptocystidia and basidiospores, ×616. (B): Hyphae of the upper context smooth or encrusted, ×1584. (C): Basidium, ×1584. (D): Basidiospore with moderate thick wall, ×1584. All figs. based on Holotype, No. 3644.

The new species is very closely related to *Corticium commixtum* Hoehn. et Litsch., but it can be separated from the latter by its having peculiar leptocystidia and non-amyloid globose basidiospores.

20. ***Phanerochaete globosum* sp. nov.** Fig. 25

Basidiocarpi resupinati, late effusi, adnati, areas orbiculares irregulares formantes, insulis parvis, 250–400 μm crassi, 1–3×3.5–5 cm, membranacei vel ceracei, rimosi, plani, glabri, albi vel eburnei, 5% KOH non reagentes; margines tenues, pruinosi, albi.

Stratum basilare contexte 50–60 μm crassum, hyphis dense intertextis distinctis; stratum intermedium contexti 150–250 μm crassum, hyphis longitrorsum intertextis distinctis; hyphae 3–4 μm latae, leptodermae, glabrae, macronoduloso-septatae; hyphae juveniles protrudentes, 37.5 μm latae, 2.2 μm latae, noduloso-septatae; hymenium 25–37 μm crassum, in palude dense dispositum; basidium subclavatum, 4 μm latum, basidio sporis 4; paraphysis subventricos vel capitata, 4–6×16–20 μm; sterigmata 0.5 μm lata, 5 μm longa; basidiospora globosa, subglobosa vel pyriformis, valde apiculata vel rostrata, 4×5–6 μm, glabra, leptoderma, nonamyloidea.

Holotypus: TAIWAN: Kaohsiung Hsien, S. Lin (NTU-2427).

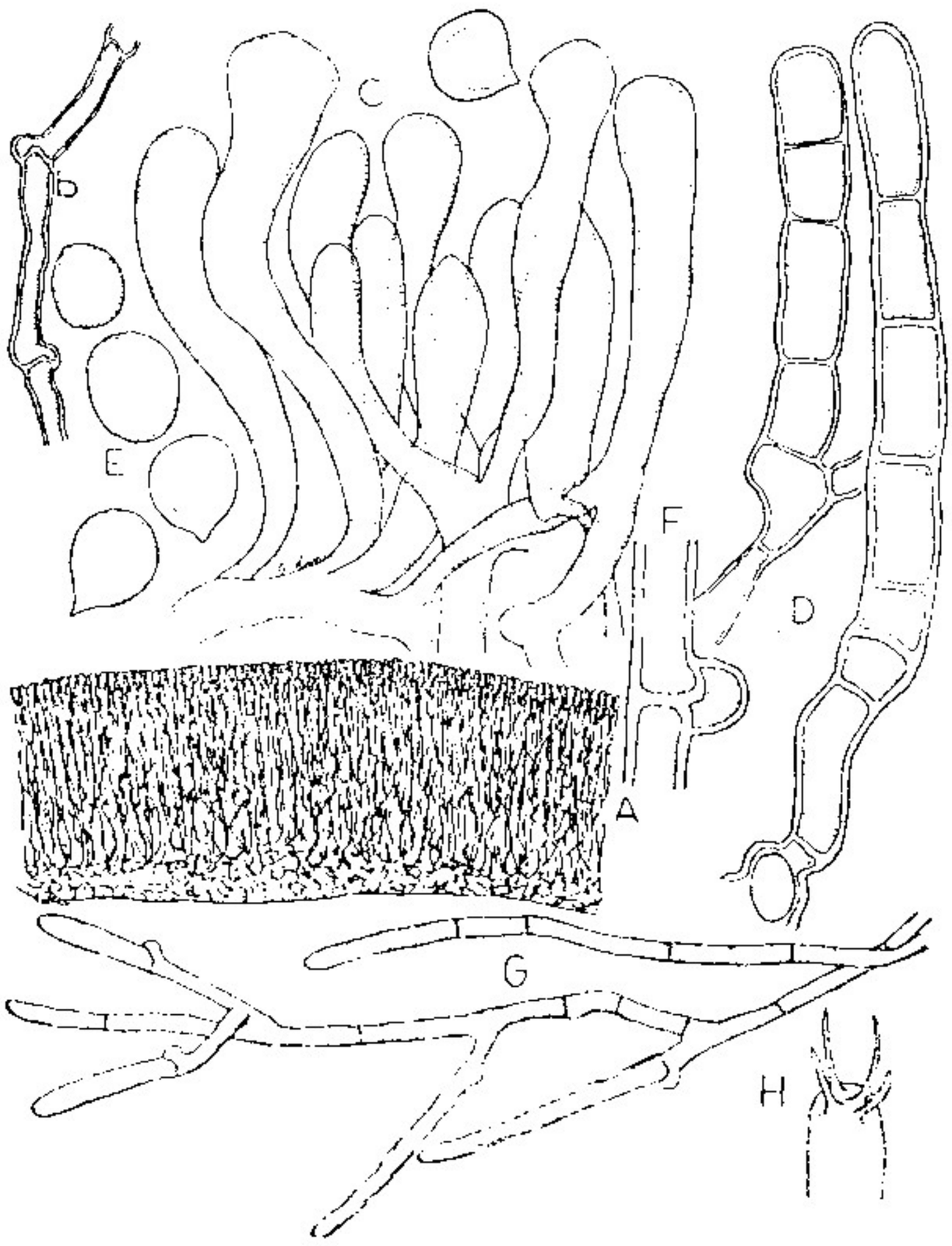

Fig. 25. *Phanerochaete globosum* sp. nov.

(A): Longitudinal section of basidiocarp showing the thin basal layer and the thick intermediate layer of the context, ×154. (B): Hypha with clamp connections, ×616. (C): Hymenial layer showing the paraphyses and basidiospore, ×1584. (D): Protruding hyphae, ×1584. (E): Basidiospores, ×1584. (F): Hypha with clamp connection, ×1584. (G): Renewed and protruding hyphae, ×616. (H): Basidium having four sterigmata, ×1584. Figs. A-F based on Holotype, No. 2427; G on No. 2410; H on No. 3602.

Macroscopic characters: Basidiocarps resupinate, widely effused, adnate, forming irregular orbicular areas, with small islands, 250–400 μm thick, 1–3×3.5–5 cm, membranaceous or ceraceous, cracked, even, smooth, pallid, white to ivory yellow, not changing color in 5% KOH; margins thining out, pruinose, white.

Microscopic characters: Basal layer of context 50–60 μm thick, of densely interwovened distinct hyphae; intermediate layer of context 150–325 μm thick, of longitudinally interwovened distinct hyphae; hyphae 3–4 μm wide, thin-walled, smooth, with large clamp connections; renewed or young hyphae protruding, 37.5 μm high, 2–2.2 μm wide, with clamp connections; hymenial layer 25–37 μm thick, densely crowded in palisade; basidia subclavate, 4 μm wide, with 4 basidiospores; paraphyses slightly ventricose, or capitate, 4–6×16–20 μm; sterigmata 0.5 μm wide at base, 5 μm long; basidiospores globose, subglobose or pyriform, strongly apiculate or rostrate, 4×5–6 μm, smooth, thin-walled, non-amyloid.

Habitat: On dead barks of conifer.

Distribution: Taiwan.

Specimen examined: Kaohsiung Hsien, the Southern Cross Highway, from Kuaigu to Tutsang, on the road side, under the conifer and hardwood mixed forests, alt. 2600 m, Jan. 25, 1975, S. Lin, (NTU-2427, Holotype; 2410, 3602).

This new taxa is characterized by its not having cystidia, having ventricose or capitate paraphyses and strongly apiculate globose basidiospores. It is very closely allied to *Corticium fallax* in shape of spores, but the context of the latter is characterized by masses of mucilage in context and by stratification of context, while that of this species is neither obscure nor stratification in context.

21. ***Phanerochaete cremea*** **(Bres.) Parmasto** Fig. 26

Consp. Syst. Cort. p. 84, 1968; —*Corticium cremeum* Bres., Fung. Trid. 2: 63, 1898; —*Peniophora cremea* (Bres.) Sacc. & Syd., Syll. Fung. 10: 195, 1902; —*Membranicium cremeum* (Bres.) Erikss., Sym. Bot. Ups. 16(I): 116, 1958; —*Phanerochaete cremeum* (Bres,) Donk, Persoonia 2(2): 223, 1962.

Macroscopic characters: Basidiocarps resupinate, widely effused, separable, soft when touched, very thick, 600–1020 μm thick, 10×20 cm, pelliculose to membranaceous, even, felty in appearance, not cracked or scarcely cracked, pale ochraceous-salmon to pale ochraceous buff, turning light buff in 5% KOH; margins thining out, floccose, white or concolorous.

Microscopic characters; Basal layer almost none; thickening of basidiocarps by reptitive intermediate layer of context in two strata; intermediate layer thick, 520–930 μm thick, of loosely interwovened hyphae; hyphae two types; one type thinwalled, smooth, septate, without clamp connections, 2.5–6.3 μm wide, branched,

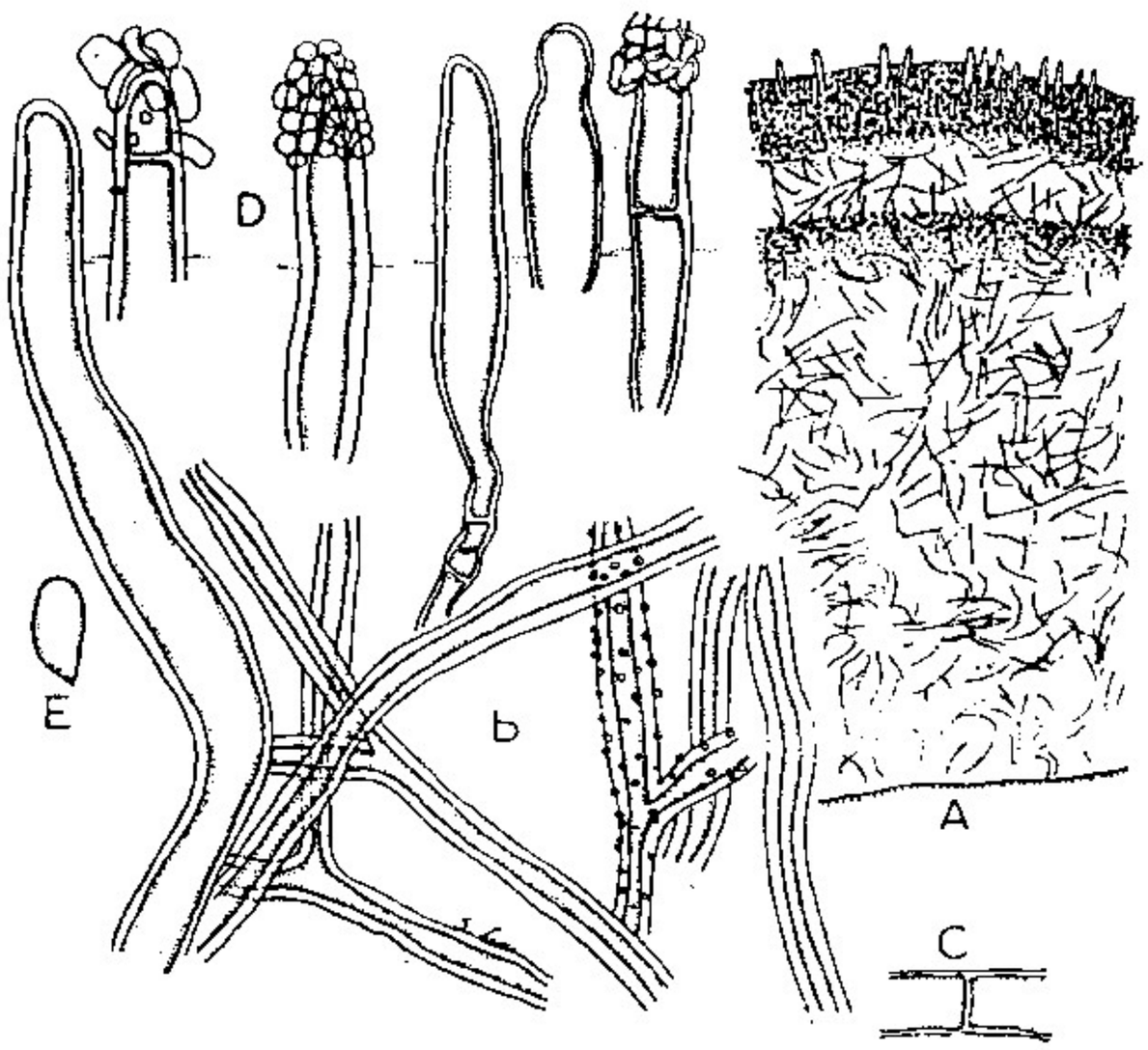

Fig. 26. *Phanerochaete cremea* (Bres.) Parmasto

(A): Longitudinal section of basidiocarp showing the stratification, the basal context consisting of very loosely interwovened hyphae and the cystidia distributed on the hymenium, ×65. (B): Encrusted or smooth branched thick-walled hyphae appearing in context, ×616. (C): Smooth thin-walled hyphae appearing in hymenium, ×1584. (D): Encrusted cystidia projecting from hymenium, ×1584. (E): Basidiospore, ×1584. All figs. based on No. 4306.

found in hymenium; the other thick-walled, 3.5–5 μm wide, with the wall 1.8 μm thick, branched, smooth or loosely or densely encrusted, composed of the context, distinct, loosely interwovened; cystidia cylindrical, rarely septate, encrusted with rough crystals around the apex of cystidia, with the crystals dissolved in 5% KOH, thin- to thick-walled, with walls up to 2 μm thick, rounded or obtuse at apex or constricted near apex, distributed only in hymenium, protruding, 15–25 μm high, 50 μm long in total, 5 μm wide near apex, 7.5–8 μm wide at the base of protruding portions, up to 11 μm wide including crystals; hymenial layer 80–90 μm thick, densely compacted, forming palisade; paraphyses clavate, 3 μm wide at apex; basidia broadly clavate; basidiospores only one to be found, not attached on sterigmata, 3.2×5 μm, oblong-elliptical, smooth, thin-walled, apiculate, non-amyloid.

Habitat: On the dead stems and branches of the broad-leaved trees.

Distribution: Europe, North America, South Africa, New Zealand, Kamchatka Peninsula, China, Japan and Taiwan.

Specimen examined: Taipei Hsien, Mt. Seven-star, on the road side, under the broad-leaved forests, alt. 700 m., Dec. 6, 1975, S. Lin (NTU-4306).

As pointed out by Dr. Hayashi (1974), this species is characterized by the thick and soft context and the thick-walled, branched and encrusted hyphae which constitute the context, but in our specimen, the fruit bodies are not deeply cracked. The cystidia is so extremely special that Price (1973) could not fit it into his recognized category. The cystidia are not typical metuloids even if they are encrusted with crystals. And he finally said that "until more cystidia of this type are described, it would be unwise to propose a new category in which to classify them".

22. *Phlebia chrysocrea* (Berk. et Curt. in Berk.) Burds. Fig. 27

Mycologia **67**: 497, f. 1-8, 9-11, 15-18, 1975; —*Corticium chrysocreas* Berk. et Curt. in Berk., Grevillea **1**: 178, 1873; —*Corticium crocicreas* Mass., Journ. Linn. Soc. Bot. **27**: 151, 1890; —*Terana chrysocreas* (Berk. et Curt. in Berk.) O. Kuntze, Rev. Gen. Plant. **2**: 872, 1891; —*Gloeocystidium chrysocreas* (Berk. et Curt. in Berk.) T. Ito, Bot. Mag. Tokyo **43**: 641, 1929; —*Kneiffia chromoplumboa* Berk. et Br., Journ. Linn. Soc. Bot. **14**: 62, 1875; —*Corticium flavocroceum* Bres., in Bourd. et Galz., Bull. Soc. Myc. Fr. **27**: 256, 1911.

Macroscopic characters: Basidiocarps resupinate, widely effused, adnate, 40–175 μm thick, 1–3×10–20 cm, membranaceous or arachnoid, even, or slightly warted by compact hyphae in fascicles when protruding, 25 μm high, 20 μm wide at base, not cracked, yellowish green, yellow to whitish yellow, turning deep violet in 5% KOH when fresh, and turning black violet when dry; margins thining out, concolorous, with mycelial strands, up to 0.5–1 mm in diam.

Microscopic characters: Basal layer 20–25 μm thick, of parallel gelatinized hyphae; intermediate layer 20–150 μm thick, of longitudinally loosely interwovened hyphae, with yellow granules deposited, often conglutinized when dry; hyphae 2–5 μm wide (2–7 μm wide in mycelial strands), thin-walled, smooth or finely encrusted, septate or with large clamp connections; cystidia (gloeocystidia) capitate, embedded abundantly, readily stained by phloxine, 8–12 μm in diameter at globose or obpyriform head, 5–9 μm wide at pedicels, thin-walled, smooth; hymenium 15 μm thick; basidia cucurbitiform, ventricose, 4×12 μm, with 2–4 basidiospores; sterigmata 5 μm long; basidiospores ovoid, elliptic, 2–2.3×3.2–4.5 μm, smooth, thin-walled, non-amyloid.

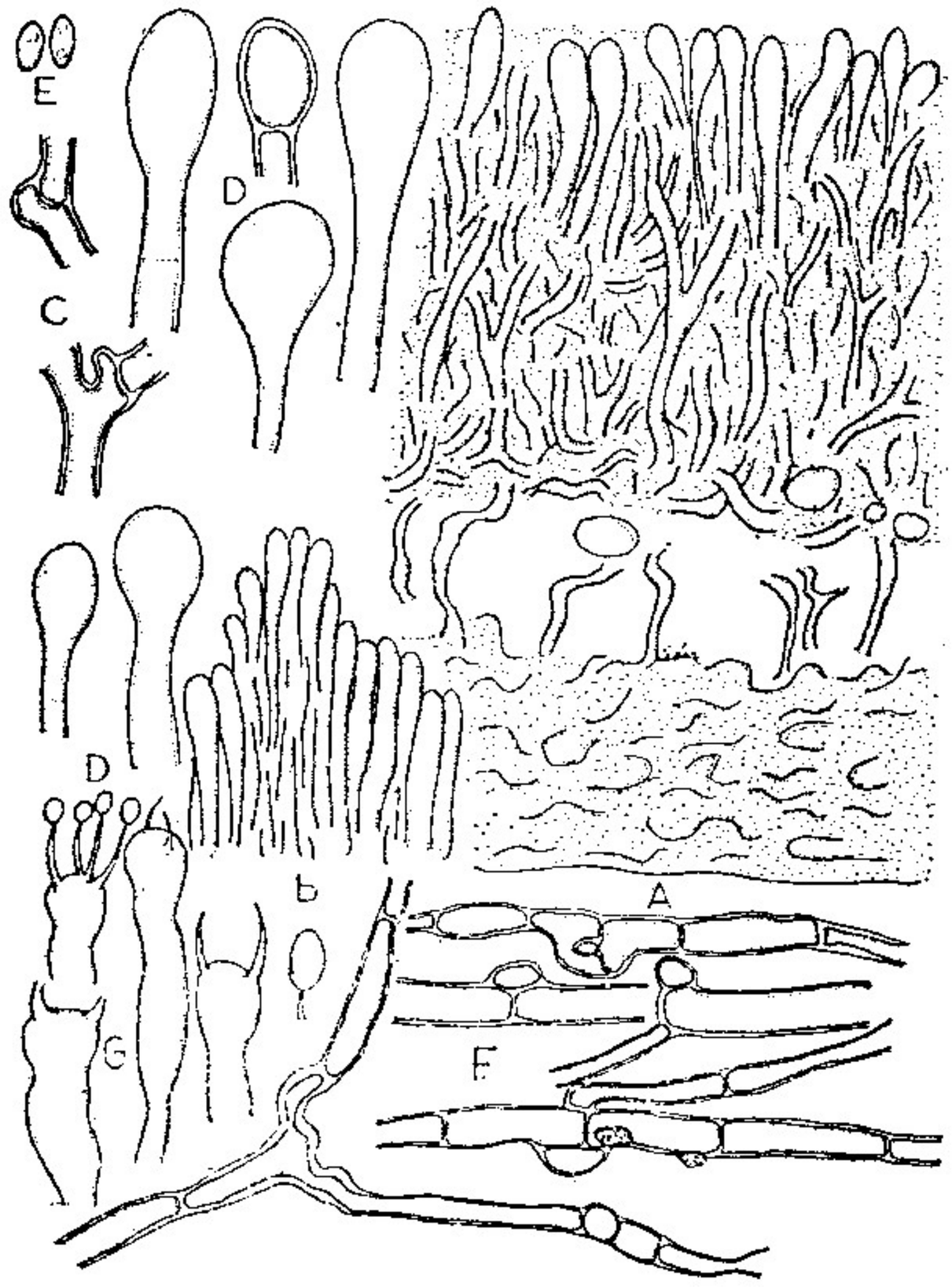

Fig. 27. *Phlebia chrysocrea* (Berk. et Curt. in Berk.) Burdsall

(A): Longitudinal section of basidiocarp showing the stronger tendency of gelatinization of basal context than that of intermediate context, and showing the basal context consisting of Parallel hyphae and the intermediate context consisting of longitudinally interwovened hyphae, ×444. (B): Slightly protruding paraphyses, ×444. (C): Hypha, ×1118. (D): Cystidia swollen at tips, ×1118. (E): Basidiospores, ×1118. (F): Hyphae, ×616. (G): Basidia and basidiospores, ×1118. Figs. A-E based on No. 2924; F on No. 3913a; G on No. 2928.

Habitat: On the dead stems and branches of hardwood, associated with white rot.

Distribution: Europe, North America, New Zealand (?), Japan, Ceylon and Taiwan.

Specimens examined: Taipei Hsien, Pinlin Hsiang, from Orchid Valley to Mt. Suchuanglo, on the road side, under the hardwood forests, alt. 500 m, July 24, 1975, S. Lin (NTU-2924, 2928), Dec. 7, 1975, S. Lin (NTU-3913-a).

This species is characterized by yellowish green hymenophores which apparently turn to deep violet in 5% KOH solution and is usually accompanied by bright yellow mycelium in faveola. Microscopically it posses cucurbitiform or ventricose basidia, capitate cystidia (gloeocystidia) and the distinguished hyphae which have large peculiar clamp connections from which a lateral hyphal branch always occurs and some of which are coated with fine crystals. It is closely allied to *Odontia wrightii* (Berk. et Curt.) Burt, but the latter has well-defined

teeth, while the *Phlebia chrysocrea* has the surface even or slightly warted. *Phlebia livida* (Pers. ex Fr.) Bres. is also readily confused with *P. chrysocrea*, however, the former can be distinguished from the latter by its pinkish-buff to bluish-gray color and thick-walled, long-celled hyphae. Additionally, *Phlebia chrysocrea* occurs exclusively on hardwoods, while *P. livida* seems to grow only on softwoods.

23. *Phlebia dictyophoroides* sp. nov. Fig. 28

Basidiocarpi resupinati, late effusi, adnati, 230-300 μm crassi, 10×20 cm, ceracei plani, distincte subtiliter rimosi, subbubalini, cremicolores vel farro-flavi, 5% KOH olivaceobubalinescentes; margines tenues, concolores vel albai.

Stratum basilare contexti almost fere nullum; pars basilaris strati intermedii dense hypha distincta intertexta, 100-170 μm crassa, hyphis longitrorsum intertextis gelatinosis obscuris; hyphae 2.5-3-(5) μm latae, noduloso-septatae, leptodermae, glabrae; cystidium fusiforme, aliquando apice incrustatum, 5-9×20-45 μm, 15-20 μm altum emergens; hymenium 25 μm crassum; basidium subclavatum, 5.2-6×13-22 μm, basidiosporis 3-4; sterigmata curvata, tenua, 1.2-1.5×4.5-5 μm; basidiospora ovata vel late ellipsoidea, 3-5×5-6.5 μm, glabra, leptoderma, apiculata, nonamyloidea.

Holotypus: TAIWAN: Kaohsiung Hsien, S. Lin (NTU-2694).

Macroscopic characters: Basidiocarps resupinate, widely effused, adnate, 230-300 μm thick, 10×20 cm, ceraceous, even, distinctly finely cracked, light buff, cream color to maize yellow, turning olive-buff color in 5% KOH (also the barks of Taiwan red pine); margins thining out, pruinose, concolorous or white.

Microscopic characters: Basal layer of context almost none; the basal part of the intermediate layer with densely interwovened distinct hyphae, occupied about one half of the thickness of the context. 100 μm thick; the upper part of

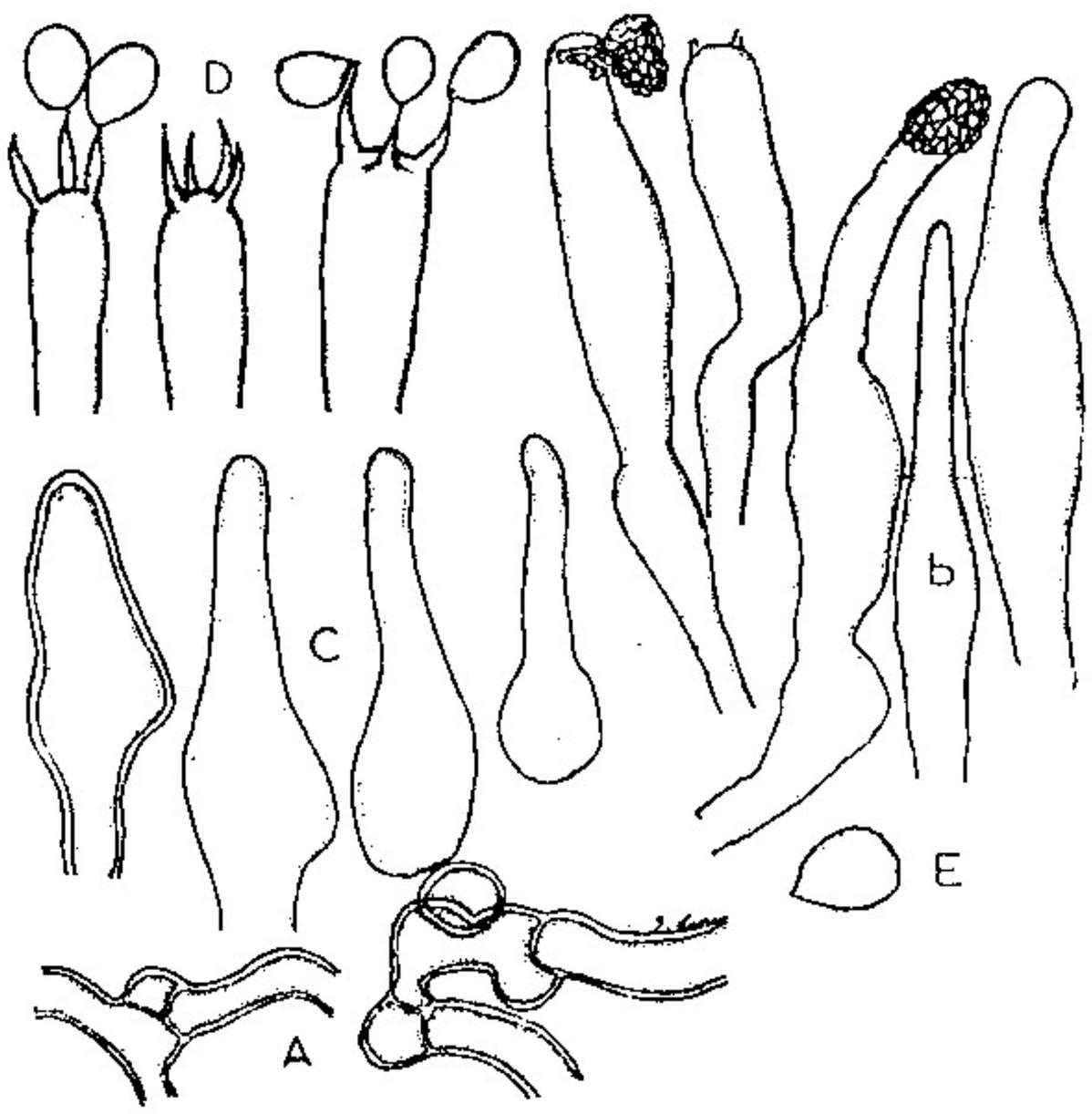

Fig. 28. *Phlebia dictyophoroides* sp. nov.

(A): Hyphae, ×1584. (B)-(C): Cystidia with encrusted caps and from which the crystals are easily brocken off, ×1584. (D): Basidia bearing basidiospores, ×1584. (E): Basidiospore, ×1584. All figs. based on Holotype, No. 2694.

intermediate layer of context 100–170 μm thick, of longitudinally interwovened gelatinized obscure hyphae; hyphae 2.5–3–(5) μm wide, with rare clamp connections, thin-walled, smooth; cystidia irregularly swollen in long spindle shape and narrowly cylindrical at upper part, rounded at apex, sometimes encrusted at tips, 5–9×20–45 μm, mostly with narrower tube-like upper parts in the width of 2.5 μm, with the crystals dissolved in KOH, confined to the hymenial layer, protruding 15–20 μm high; hymenial layer 25 μm thick, with the elements arranged in palisade; basidia subclavate, 5.2–6×13–22 μm, with 3-4 basidiospores; sterigmata slender at tips, curved, 1.2–1.5 μm wide at base, 4.5–5 μm long; basidiospores ovate, broadly ellipsoid, 3–5×5–6.5 μm, smooth, thin-walled, apiculate, non-amyloid.

Habitat: On the barks of the dead Taiwan red pine, *Pinus taiwanensis* Hayata.
Distribution: Taiwan.

Specimen examined: Kaohsiung Hsien, the Southern Cross Highway, Yaco, on the open areas, alt. 3500 m, Jan. 25, 1975, S. Lin (NTU-2694, Holotype).

The new species is characterized by its having spindle shaped cystidia and their tips covered with crystals which are sometimes readily brocken off.

Very closely related to *Hyphodontia sambuci* (Pers.) Erikss. in leptocystidia, hyphae, spores, but the new species can be separated from *Hyphodontia sambuci* by its macroscopic characters, i. e. thicker fruit bodies, maize yellow and turning olive-buff color in KOH solution, and by its cystidia not capitate and sometimes encrusted at apical portions, and having densely interwoven hyphae at the base of the intermediate layer.

24. ***Resinicium bicolor*** **(Fr.) Parm.** Figs. 29, 30

Consp. Sys. Cort. p. 97, 1968, *Odontia bicolor* (Albert. et Schwein ex Fr.) Bresad., Ann. Myc. 1: 87, 1903; —*Hydnum bicolor* Albert. et Schwein. ex Fr., Syst. Myc. 1: 417, 1821, Hym. Eur., p. 615, 1874; —*Hydnum subtile* Fr., Syst. Myc. 1: 425, 1821; *Odontia subtilis* Quel., Fl. Myc. Fr., 435, 1888; —*Hydnum serratum* Peck, Ann. Rep. N. Y. State Mus. 50: 112, 1897; —*Hydnum echinosporum* Vel., Ceske Houby. 745, 1922.

Macroscopic characters: Baidiocarps resupinate, widely effused, adnate, 2–5× 9–23 cm, 100–350 μm thick, ceraceous to cretaceous, pruinose, crossly creviced, white to light buff, not changing color in 5% KOH; margins thining out, tomentose, concolorous; spines minutely protruding, conical, free, moderately dense, fimbriate or truncate at apex, about 100 μm high, 30–250 μm wide at base.

Microscopic characters: Basal layer of context, of parallel gelatinized hyphae, often in stratification, and not easy to distinguish from the substrata, hyaline or opaque; intermediate layers of context thicker than basal layer, composed of conglutinated loosely interwovened hyphae, with crystals embedded and turning dark color after treated with 5% KOH and phloxine; hyphae 1.8–3.2 μm wide, thin-walled, smooth, sometimes covered with densely radiate crystals, with clamp connections; cystidia of two types, protruding on the hymenium and spine surfaces and immersed in context; one type with terminal globose shape, covered by loosely or densely radicate crystals, 5–18 μm in diam., with the pedicels 3–4 μm wide, sometimes constricted near the apex; the other with terminal swelling, never encrusted at the head, containing yellow materials and easily stained by phloxine, 5–10 μm in diam., with the pedicels 3–4 μm wide; hymenium composed of basidia, paraphyses and two types of cystidia, arranged in palisade; basidia clavate, 4.5–5×16–20 μm, with 2–4 basidiospores; sterigmata 4 μm long, straight; basidiospores ellipsoid, 3–3.5×4–5.5 μm, thin-walled, smooth, l-guttulate, non-amyloid.

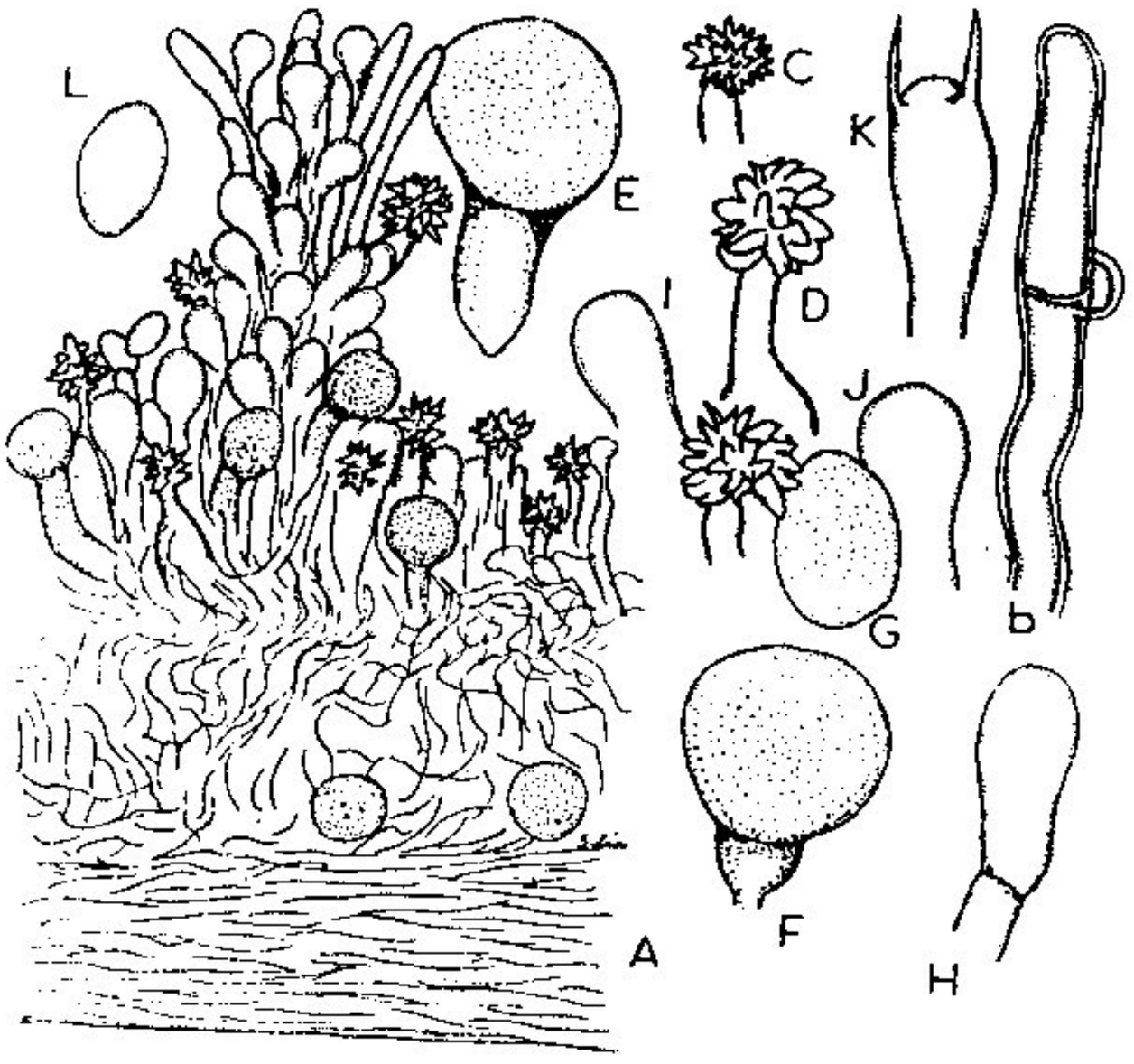

Fig. 29. *Resinicium bicolor* (Fr.) Parm.

(A): Longitudinal section of basidiocarp, ×616. (B): Sterile hypha protruding from the apex of spine, ×1584. (C): Radiately encrusted terminal hypha, ×616. (D): Radiately encrusted terminal hyphae, ×1584. (E)-(G): Globose cystidia, ×1584. (H)-(K): Paraphyses and basidium, ×1584. (L): Basidiospore, ×1584. All figs. based on No. 3153.

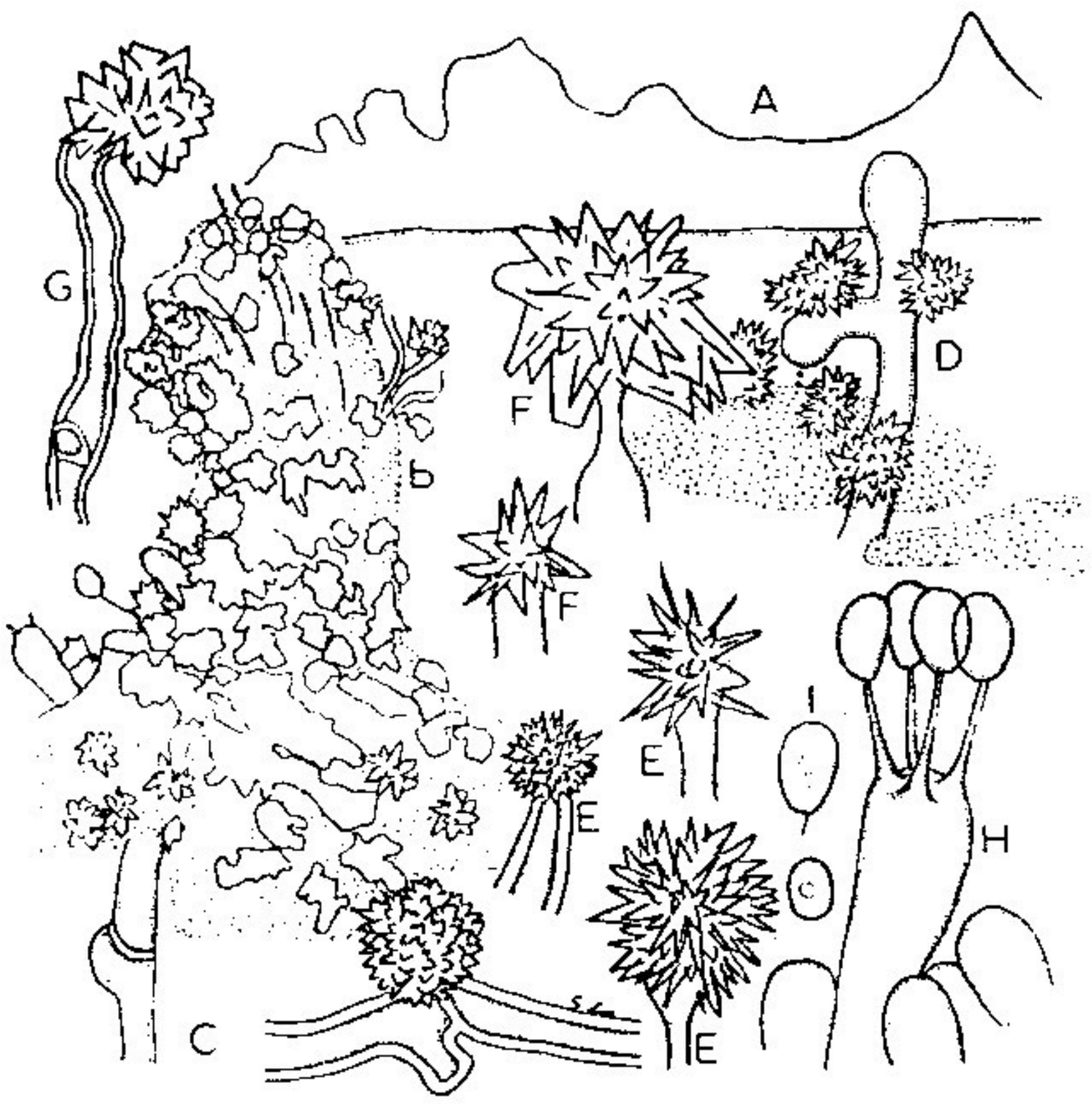

Fig. 30. *Resinicium bicolor* (Fr.) Parm.

(A): Longitudinal section of basidiocarp and a part of substratum showing the relative position of the parasitic fungi, ×65. (B): Spines, ×616. (C)-(D): Hyphae attached by radiating crystals, ×1584. (E): Terminal encrusted cystidia, ×616. (F)-(G): Terminal encrusted cystidia, ×1584. (H): Basidium and basidiospores, ×1584. (I): Basidiospores, ×1584. All figs. based on No. 3139.

Habitat: On the dead twigs and stems of the broad-leaved trees, often associated with unknown parasitic fungi in the substrata, and also associated with white rot.

Distribution: Europe, North America, New Zealand, USSR, Japan and Taiwan.

Species examined: Taipei Hsien, Pinlin Hsiang, from Orchid Valley to Mt. Suchuanglo, on the road side, under the hardwood forests, 400-500 m, Dec. 7, 1975, S. Lin (NTU-3139); Taipei Hsien, Mt. Seven-star, under the primary hardwood forests, alt. 700 m, Dec. 6, 1975, S. Lin (NTU-3153).

The two types of beautiful cystidia of the species are the diagnostic character by which this species can easily be separated from other known species of the genus. It is a cosmopolitan species.

25. ***Tubulicrinis glebulosa*** **(Bres.) Donk** Fig. 31

Fungus 26: 14, 1956—*Tubulicrinis gracillima* (Ell. & Everh. ex Rogers & Jacks.) Hayashi, Bull. Gov. For. Exp. Stat. No. 260: 44, f. 33-34, 1974; —*Peniophora gracillima* Ell. & Everh. ex Rogers & Jacks., Farlowia 1(2): 317, 1943.

Macroscopic characters: Basidiocarps resupinate, effused, adnate, thin to thick, 50 μm thick in NTU-3502, 100-250 μm thick in NTU-4386, membranaceous, even pilose, densely and deeply cracked in the latter collection, cream color to olive buff, not changing color or becoming dusky in 5% KOH; margins thining out, pruinose, concolorous or white.

Microscopic charactes: Context with the slight differentiation of basal and intermediate layer, opaque and obscure, strongly gelatinized, 50-250 μm thick, 1-4 stratose, 50 μm thick at the lowest stratum, 25 μm and 20 μm thick, at the upper strata, with 3 μm thick of narrow band of parallel hyphae and longitudinally intertwined hyphae in each layer; hyphae thin-walled, 1-3 μm wide, always collapse

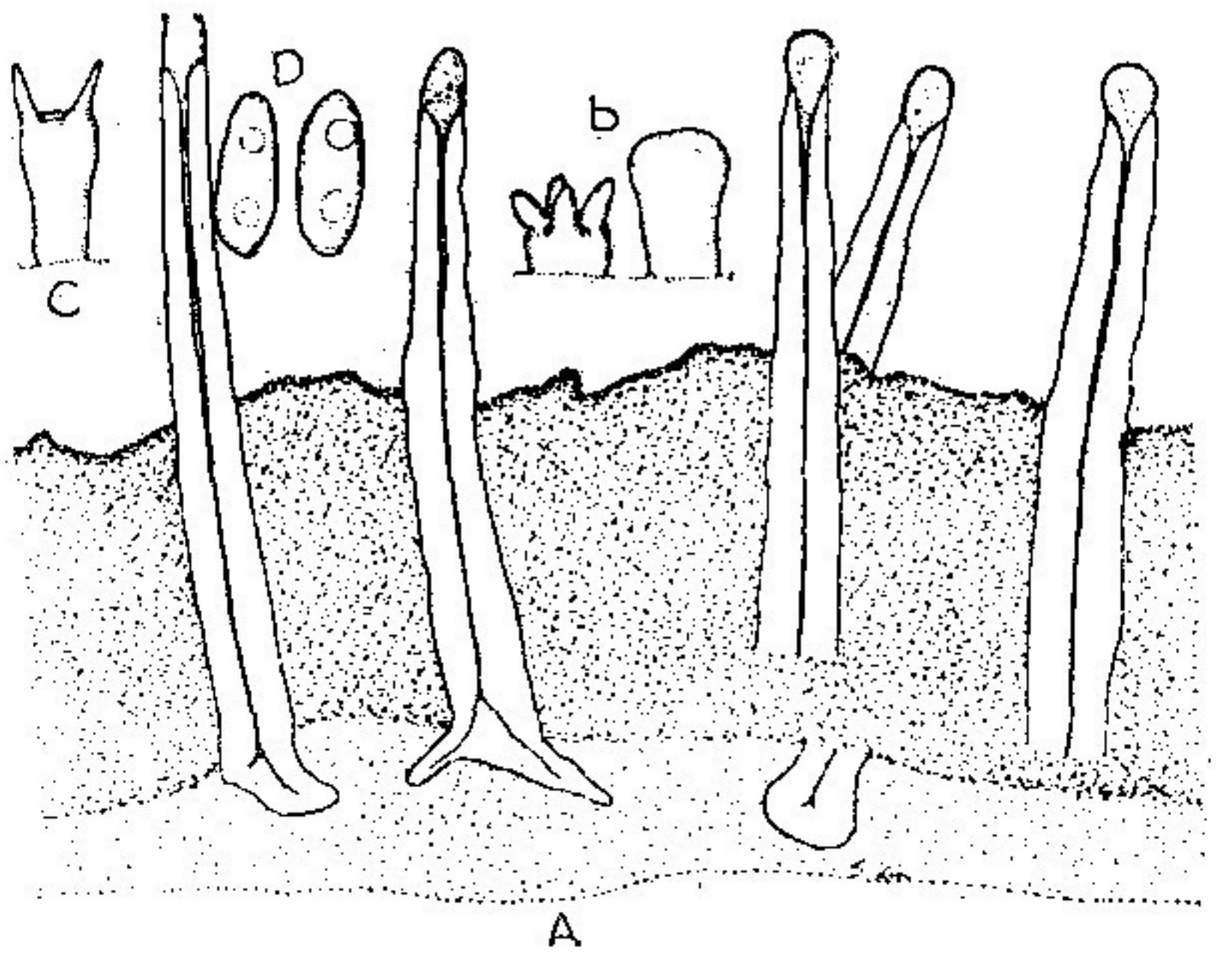

Fig. 31. *Tubulicrinis glebulosa* (Bres.) Donk

(A): Longitudinal section of basidiocarp showing the cystidia arising from the basal context, through the intermediate context and hymenial layer, and then protruding, ×616. (B)-(C): Paraphysis and basidia, ×1584. (D): Basidiospores, ×1584. All figs. based on No. 3502.

or gelatinized, with clamp connections, or slightly thick-walled aseptate, comparatively broader, up to 3 μm or more, densely interwovened within substratum or basal layer of context; cystidia cylindrical, straight, not encrusted, arising from the basal layer, with capillary lumen, expanding near tip, with diameter broadened to as much as 5 μm, and 7-11 μm long, with rounded obtuse thin-walled apex and forming subglobose, obovoid, ovoid to oblong bodies which easily stained by phloxine, with the wall easily dissolved in 5% KOH, protruding 30-43 μm high, 7.5-12.5×75-170 μm; hymenial layer 25 μm thick; basidia clavate, 3-4×15 μm, protruding 8 μm high, with 2-4 basidiospores; paraphyses cylindrical to clavate, 4 μm wide; young sterigmata 2 μm long; basidiopores (not attached to basidia) narrowly elliptical, 2.5×7 μm, smooth, thin-walled, non-amyloid.

Habitat: On the dead branches of the broad-leaved trees and dead branches of *Chamaecyparis formosensis* Matsum. (NTU-4386).

Distribution: Europe, North America, South Africa, New Zealand, Japan and Taiwan.

Specimens examined: Taipei Hsien, Pinlin Hsiang, from Orchid Valley to Mt. Suchuanglo, on the road side, under the hardwood forests, alt. 400-500 m, July 24, 1975, S. Lin (NTU-3502); Hsinchu Hsien, Mt. Dabajen, on the dead branches of *Chamaecyparis formosensis* Matsum., under the *Chamaecyparis formosensis* forests, full shade, alt. 2000-2500 m, Feb. 28, 1976 S. Lin (NTU-4386).

The collections from Taiwan are considered to agree well with *Tubulicrinis gracillima* (Ell. et Everh. ex Rogers et Jacks.) Hayashi. The fructification of NTU-3502 from Taiwan sometimes is not cracked.

26. *Xenasma tulasnelloideum* (Hoehn. et Litsch.) Donk **Fig. 32**

Fungus **27**: 26, 1957; —*Corticium tulasnelloideum* Hoehn. et Lietsch. K. Akad. Wissensch. Wien **117**: 1118, 1908; —*Corticium incanum* Burt, Ann. Ann. Mo. Bot. Gadn. **13**: 205, 1926; —*Hypochnus tulanelloideum* (Hoehn. et Litsch.) Rea. Trans. Brit. Myc. Soc. **12**, 222, 1927.

Macroscopic characters: Basidiocarps resupinate, widely effused, closely adnate, thin, 30-70 μm thick, 7×20 cm, ceraceous-gelatinous, smooth, even, not cracked, pale olive gray, pearl gray, lilac gray or white when dry, turning black color in 5% KOH; margins thining out, pruinose, concolorous.

Microscopic characters: Without differentiation of basal and intermediate layer of context; context about 15-55 μm thick, of gelatinized interwovened hyphae,

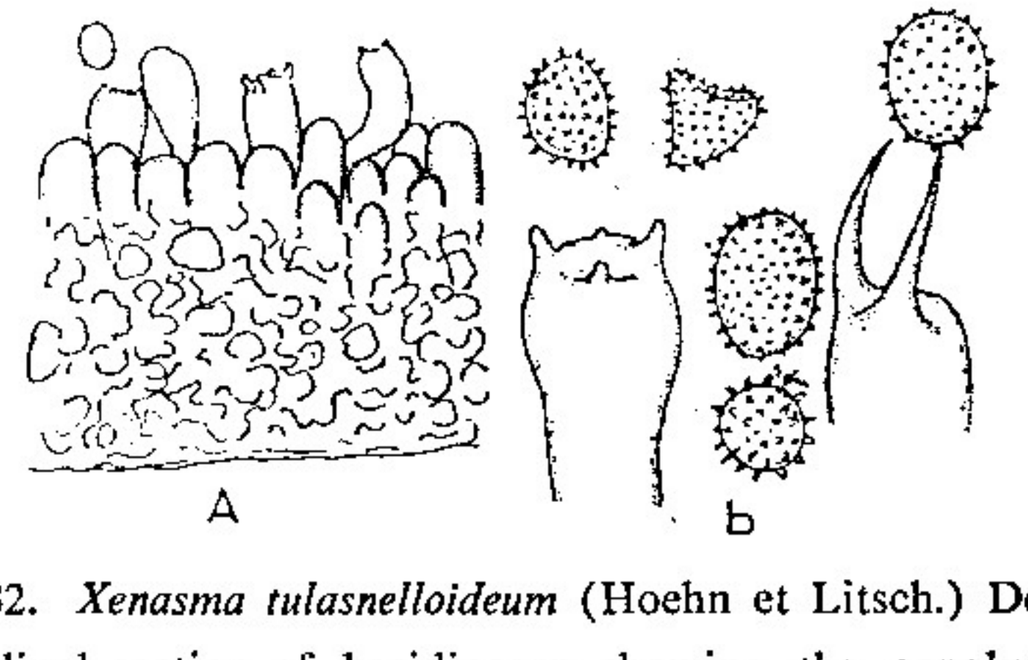

Fig. 32. *Xenasma tulasnelloideum* (Hoehn et Litsch.) Donk

(A): Longitudinal section of basidiocarp showing the conglutinized context, hymenial layer and basidiospores, ×616. (B): Basidia and basidiospores, ×1584. All figs. based on No. 4301.

opaque, indistinct; hyphae 2-3 μm wide, thin-walled, septate, without clamp connections, gelatinized; hymenium 15 μm thick, with half lower portions gelatinized with context; basidia clavate or cylindrical, thin-walled, with 2-4 basidiospores; sterigmata 1.5 μm wide at base, 5 μm long, curved; basidiospores broadly ellipsoid to subglobose, rarely triangular, 3.5-4×4.5-6 μm, distinctly echinate, thinwalled, amyloid.

Habitat: On the dead stems of the broad-leaved trees.

Distribution: Europe, Great Britain, North America, Australia, New Zealand and Taiwan.

Specimen examined: Taipei Hsien, Wulai Hsiang, Doll Valley, on the road side, under the hardwood forests, alt. 300 m, Dec. 25, 1975, S. Lin (NTU-4301).

The pale olive-gray fructifications, waxy-gelatinous consistency and the echinate spores are the diagnostic characters of the species.

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臺灣產皮殼菌科及背着性針齒菌科之研究

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摘　要

本篇報導臺灣產皮殼菌科 (Corticiaceae) 及背着性針齒菌科 (resupinate Hydnaceae) 10屬，26種。其中8種爲新種如 *Hyphodontia crassa* sp. nov., *Hyphodontia dimorpha* sp. nov., *Hyphodontia lageniformis* sp. nov., *Peniophora spathulata* sp. nov., *Phanerochaete alba* sp. nov., *Phanerochaete commixtoides* sp. nov., *Phanerochaete globossum* sp. nov., *Phlebia dictyophoroides* sp. nov., 新組合種一種：*Hyphodontia mucronata* (Furukawa) comb. nov., 新品種一種：*Gloeocystiellum luridum* (Bres.) Boid. var. *microsporum* var. nov., 其餘爲臺灣新記錄。